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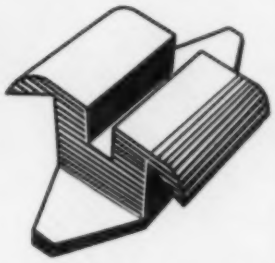

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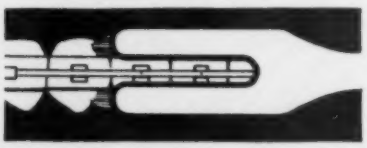

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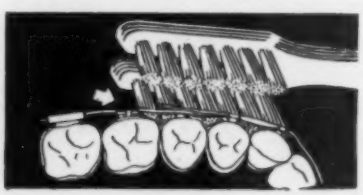


Franklin A. Squires, Secretary-Treasurer of the American Association of Orthodontists, 1952-1953

American Journal
of
ORTHODONTICS

VOL. 39 FEBRUARY, 1953 NO. 2

Original Articles

EVOLUTIONARY TRENDS IN ORTHODONTICS, PAST, PRESENT, AND FUTURE

CHARLES H. TWEED, D.D.S., TUCSON, ARIZ.

IN THE February, 1952, issue of the JOURNAL, Dr. Waugh has reviewed the first half-century of the American Association of Orthodontists' activities. He states that the American Association of Orthodontists was a direct outgrowth of the Angle School of Orthodontia, and that on June 11, 1901, President Edward H. Angle opened the first session of this society of orthodontists.

Much has been written concerning the life of the first president of this organization up to the official closing of the Angle School in Pasadena in 1926. After that date, he fades from the picture. It becomes my pleasure to complete partially the final chapter of this man Angle's life, and inform you that after the closing of the school his activities were turned in the direction of orthodontic legislation. His heart and soul were wrapped up in the destiny of orthodontia. It was his belief that orthodontia could not fulfill its rightful place as a respected science until necessary laws were passed in each state governing its practice. His efforts were focused in this direction until the day of his death.

It was my great privilege to play a part in the last act of this man's life. In the summer of 1928, an enthusiastic young man dashed out of Pasadena, Calif., and into his native state of Arizona to change the course of the orthodontic world overnight. He believed then, as he does now, that Dr. Edward H. Angle was the greatest constructive influence that ever graced the specialty of orthodontia.

This young man had but two thoughts in his head at this time and his teacher was responsible for both:

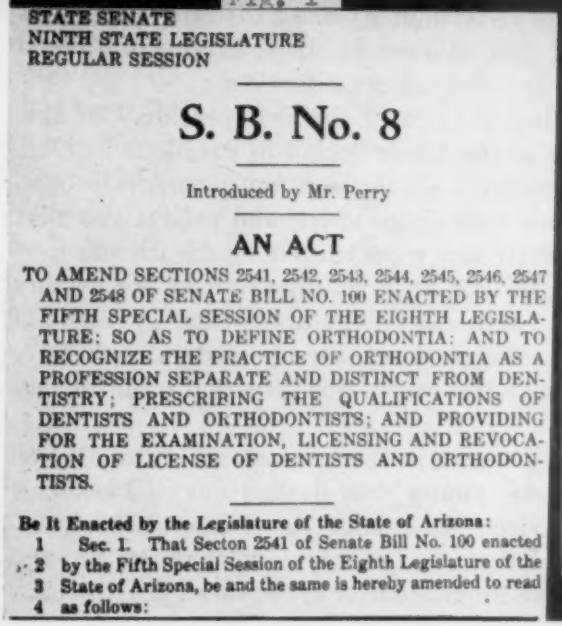
1. There must be laws enacted by each state governing the practice of orthodontia similar to the laws governing the practice of medicine and dentistry. The still prevalent custom of requiring State Board Examinations to demonstrate proficiency in general dentistry, and then giving the successful applicant the legal right to practice orthodontia without examination is antiquated and requires revision for the protection of children.
2. He must develop himself into a capable orthodontist.

Presented at the Forty-eighth Annual Meeting of the American Association of Orthodontists, St. Louis, Mo., April 22, 1952.

Taking things in their logical order, this naïve young man pledged his best efforts to correct this situation in his state. He traveled for three months and interviewed over 90 per cent of the practicing dentists. They seemed pleased that their state might have the honor of being the first to enact a specialty law governing the practice of orthodontia. The law was enacted by the Legislature, and Governor Phillips signed the bill in January, 1929 (Fig. 2).

Few orthodontists remember or realize the tremendous influence for good the passage of such a law has had on the development of orthodontia. Previous to 1929, orthodontia occupied a most inconspicuous place in the curriculum of leading dental schools. With the exception of the University of Illinois, which was developing its graduate school at this time, there were no graduate courses in orthodontia leading to a degree. The dental schools were forced to realize they must give more and better undergraduate training or orthodontia would divorce itself from dentistry, in much the same manner as dentistry divorced itself from medicine a hundred years before, and emerge a separate and distinct profession as defined in the Arizona law (Fig. 1).

Fig. 1



STATE SENATE
NINTH STATE LEGISLATURE
REGULAR SESSION

S. B. No. 8

Introduced by Mr. Perry

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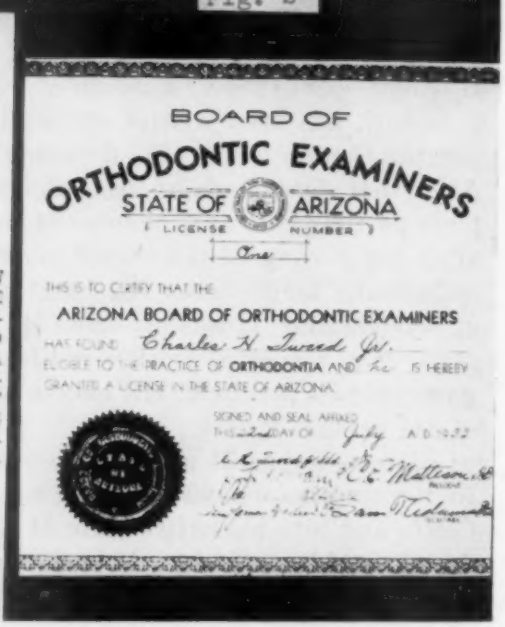
TO AMEND SECTIONS 2541, 2542, 2543, 2544, 2545, 2546, 2547 AND 2548 OF SENATE BILL NO. 100 ENACTED BY THE FIFTH SPECIAL SESSION OF THE EIGHTH LEGISLATURE: SO AS TO DEFINE ORTHODONTIA: AND TO RECOGNIZE THE PRACTICE OF ORTHODONTIA AS A PROFESSION SEPARATE AND DISTINCT FROM DENTISTRY; PRESCRIBING THE QUALIFICATIONS OF DENTISTS AND ORTHODONTISTS; AND PROVIDING FOR THE EXAMINATION, LICENSING AND REVOCATION OF LICENSE OF DENTISTS AND ORTHODONTISTS.

Be It Enacted by the Legislature of the State of Arizona:

Sec. 1. That Secton 2541 of Senate Bill No. 100 enacted by the Fifth Special Session of the Eighth Legislature of the State of Arizona, be and the same is hereby amended to read as follows:

Fig. 2



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ELIGIBLE TO THE PRACTICE OF ORTHODONTIA AND he IS HEREBY
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SIGNED AND SEAL AFFIXED
THIS 2nd DAY OF July A.D. 1929

This new law did not meet with the approval of the dental profession at large. Two years after its passage, the American Board of Orthodontia was born as a better means of controlling the standards of those practicing orthodontia. Pressure from without the state to repeal the Arizona law was successful six years later. It is interesting to note that in 1929 my state was the only state with a specialty law governing the practice of orthodontia (Fig. 2). Today, Arizona is one of the few states that has no laws governing the practice of any of the specialties of dentistry. While the Arizona specialty law was undergoing its evolution from birth to death, the young orthodontist was busy evolving his ideas on orthodontic treatment.

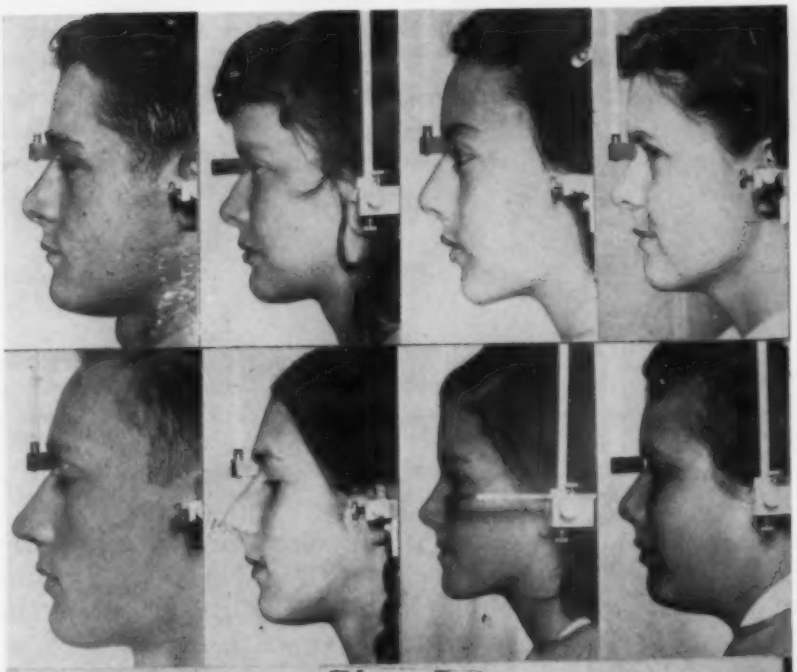

Fig. 3

Fig. 4

The contents of this paper outlining the evolution of my orthodontic thinking, and every effort I have made and will ever make in promoting better orthodontics, have been the direct result of the intimate association with Dr. Angle from 1928 until his death.

When your program chairman requested that I prepare this paper outlining the evolution of my orthodontic thinking over a period of twenty-five years in the practice of clinical orthodontics, he was, perhaps, aware of the fact that the first paragraph in Chapter III, Angle's seventh edition, would be the theme of my paper:

> The study of orthodontia is indissolubly connected with that of art as related to the human face. The mouth is a most potent factor in making or marring the beauty and character of the face, and the form and beauty of the mouth largely depend on the occlusal relations of the teeth. Our duties, as orthodontists, force upon us great responsibilities, and there is nothing in which the student of orthodontia should be more keenly interested than in art generally, and especially in its relation to the human face, for each of his efforts, whether he realizes it or not, makes for beauty [Fig. 3] or ugliness [Fig. 4], for harmony or disharmony, or for perfection or deformity of the face. Hence it should be one of his life studies. (Angle.)

I shall always believe Dr. Angle was correct when he so earnestly taught that "the line of occlusion" is synonymous with harmony, balance, beauty, and art, and in a permanently successful treatment it is impossible to attain one of these goals without attaining all the others (Fig. 3).

Twenty-five years of effort have proved that "normal occlusion" and its twin "the ultimate in facial balance" in their true sense are possible for few orthodontic patients. For the majority of patients, because of insurmountable limitations within the individual, orthodontists can strive only for as near an approach to normal in dental relationships and facial balance as conditions will allow.

To avoid misunderstanding, I wish to define "normal" in the sense that I will use it from here on, as that balance and harmony of proportions considered by the majority of us as most pleasing in the human face (Fig. 3). I will use the term to describe my concept of an ideal dentofacial pattern, fully realizing that in such a heterogeneous group as our American white population, there can be not true normal in morphologic considerations. Because of the large range in variation in such a mixed white population as ours, it becomes essential that orthodontists have some definite standard to guide them in their treatment problems—hence, one should have a definite concept of his idea of the normal to guide him at all times.

These treated orthodontic patients represent some of the variations in our American white population (Fig. 3). The types are dissimilar but each possesses balance and harmony of facial lines. Contrast the balance and harmony of facial lines demonstrated in these near approaches to the normal with the lack of these qualities in the faces of the patients demonstrated in Fig. 4, and you should be able to understand why it is important to possess a good concept of the normal.

For more than six years, I practiced and advocated that philosophy of orthodontic treatment which demanded the full complement of teeth. During

this time, late in 1934, as a result of my inability to create balance in but few of my patients, I began the project of analyzing my practice results which was to require half my time for four years. This project called for models, photographs, and x-rays for all patients treated by me up to that time.

Records were secured for more than 80 per cent of the practice.

Fig. 5

Fig. 6

My orthodontic objectives were the same then as they are today, and are as follows:

1. The best balance and harmony of facial lines.
2. Stability of denture after treatment.
3. Healthy mouth tissues.
4. An efficient chewing mechanism.

The photographs were classified into two groups:

1. Those with balance and harmony of facial proportions (Fig. 5).
2. Those who lacked these qualities (Fig. 6).

In virtually every instance, those patients possessing balance and harmony of facial proportions had mandibular incisors that were upright over basal bone such as these (Fig. 7). The faces that lacked these attributes of facial proportions had teeth that were too prominent and the mandibular incisors were not upright and over basal bone. It was noted that the lack of harmony in facial contour was in direct proportion to the extent to which the denture had been displaced mesially into protrusion (Fig. 8).

It was observed that the attainment of all four orthodontic objectives had been successful in only 20 per cent of these cases. Harsh facts all but made me give up the practice of orthodontia.

The result of this experience prompted me to search for and secure models and photographs of many normal people who had never had orthodontic treatment. A study was made of the facial balance and harmony of these individuals. The relationship of teeth to basal bone in these normals was carefully noted, especially the variation in the inclinations of the mandibular incisor teeth. Prior to this time, a cephalometer was a scientific instrument of which I knew little, and I was visually relating the inclinations of the incisors to the body of the mandible, meaning the long axis of the body of the mandible. This is the face of the nonorthodontic normal showing the greatest distal position of teeth of any of the normals studied (Fig. 9, *a*). The inclination of the mandibular incisor when related to the lower border of the mandible is approximately 85 degrees or –5.

The average nonorthodontic normal selected from the group presented facial balance and harmony such as seen here (Fig. 9, *b*). The inclinations of the mandibular incisors are 90 degrees or 0 when related to the mandibular border.

The nonorthodontic normal having the most mesially positioned denture of this group of normals presented the balance and harmony of facial lines demonstrated in Fig. 9, *c*. Here, the inclination of the mandibular incisor, when related to the plane formed by the lower border of the mandible, is 95 degrees or +5. The range of the inclinations of the mandibular incisors in this group of nonorthodontic normals is approximately 10 degrees and is virtually the identical range found in my treated cases where I had accomplished my four orthodontic objectives and had attained the desired balance and harmony of facial proportions that are possible only when a very near approach to normal has been attained (Figs. 3, 14, 22, 23, 24, 25, and 26). My conclusions, as a result of these studies, were and are that the orthodontist must, if he is to attain facial esthetics and dentures similar to those found in nonorthodontic normals, position the mandibular incisors within this normal range of – or +5 degrees. Progress was being made, but, at this time, I did not realize that to attain this goal the patient must have a normal face pattern and present no discrepancy between size of teeth and size of basal bones.

Fig. 7

Fig. 8

During part of the years when the foregoing studies were made, the Angle philosophy of treatment prescribed for the edgewise arch mechanism was diligently followed. Frequent relapses and my inability to create satisfactory facial proportions for the majority of patients resulted in attempts as early

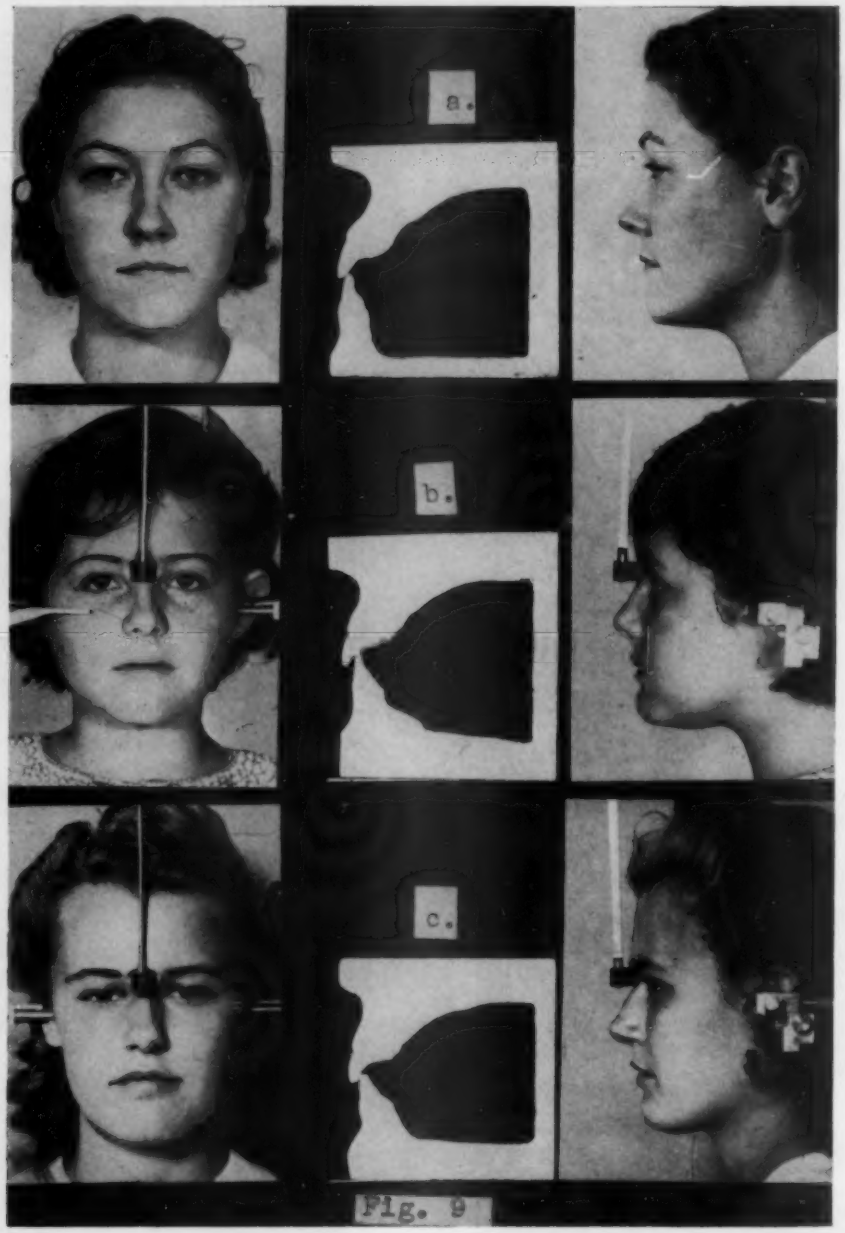

Fig. 9

as 1931 to revise the mechanics of treatment. I was endeavoring to exercise what my teacher termed "horse sense, the greatest of all senses," and beginning to observe that the mandibular incisors were skidding or tipping mesially

off basal bone, particularly in Class II cases where long use of intermaxillary force had been necessary without correct anchorage preparation.

I recalled the maxim of dental school that in full denture work one must position the teeth on the "ridge" because the mechanics of the denture demanded such a position to achieve stability. If the teeth had to be placed on the ridge in full denture cases for reasons of stability, why should not these same rules of mechanics apply to the human denture? By 1935, I was extracting deciduous first molars, where space had been lost due to premature loss of the deciduous cuspid, to allow the cuspid teeth to erupt without flaring the incisors mesially. The earlier treatment mechanics were revised and no longer were all treatment movements started simultaneously. I was using second order bends in the mandibular arch to enhance anchorage and in the maxillary arch to aid in moving the maxillary teeth distally and was using up and down elastics in the cuspid areas to prevent depression of these teeth and elevation of the molar anchor teeth. This prevented opening of the bite. I was also using a bite plane and sectional arch wires with up and down elastics to erupt the teeth in the buccal segments to gain vertical height when that was necessary, and was recognizing that Class II protrusions never seemed to develop a chin as result of function. Upon completion of the practice analysis, I was convinced that to gain balance and harmony of facial lines, it was necessary to place and retain the mandibular incisors within the + or –5 degree range throughout treatment (Fig. 9). Considerable effort was made to place them so without resorting to the removal of teeth. In some instances, this was possible by overexpansion of the dental arches, but too often at the expense of impacting both unerupted second and third molars. The usual aftermath of such treatment was relapse when retention was discontinued, plus lasting damage to investing tissues.

As a result of the experience gained during the practice analysis and the study of the facial esthetics of my nonorthodontic normals, I developed a concept of the normal as I visualize it. It was the image of that face in balance and harmony described by Angle. The features of this image were a composite of all six of the fundamental qualities found in the mouths and faces of all the children in whom I had attained all four orthodontic objectives and in all the nonorthodontic normal people I had studied (Figs. 3 and 9). A concept of the normal is an indispensable part of the orthodontist's equipment. Without it, he does not know where or when to begin or end his treatment, but proceeds blindly, hoping that favorable growth factors and inanimate metals will come to his rescue.

To possess this concept of the normal and be unable to execute it in treatment procedures was frustrating and resulted in the decision to extract some teeth. Only those who have had similar experiences will ever know how difficult it is to give up what had been a part of one's ideals and to begin to do the very thing he had once held contemptible in others.

In the beginning, two similar discrepancy cases were selected, both male and both 13 years of age. One was treated by retaining all the teeth (Fig. 11),

and in the other, four first premolars were removed (Fig. 10). The case was treated, perhaps not too well, for this was the first attempt at this kind of treatment and there was no established technique to serve as a guide. The results of treatment were most gratifying (Fig. 10). Here was a near approach to the visualization of balance and harmony. Not so the other case which was the control (Fig. 11).

Fig. 10

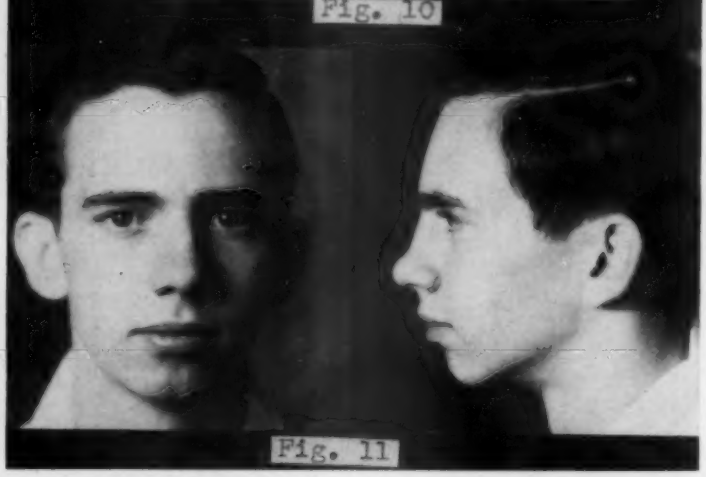

Fig. 11

The experiment was repeated, doubling the numbers, and the end results were similar.

Finally, a group of 26 patients, presenting a discrepancy between size of teeth and size of basal bones, was selected. They were first treated retaining all the teeth. Observe the results of such treatment in the middle figures.

Compare with the lower figures which are the results of retreatments after the removal of the first premolar teeth. (Figs. 12 and 13.)

This procedure of first treating without extracting teeth, if there was any question of the necessity than the usual failure and retreatment after the re-

Fig. 12

moval of the first premolars, continued for about ten years. Finally, the percentage of extraction cases reached between 75 per cent and 80 per cent, and foresight caught up with hindsight. It was recalled that in the analysis of the nonextraction practice, only 20 per cent of the treated cases were successful.

The reason become clear. About 80 per cent of the children who come to the orthodontist for treatment are either discrepancy cases to begin with or are man-made protrusions due to the use of faulty mechanics when the orthodontist completes his treatment. Had foresight been as keen as hindsight,

Fig 13

40 per cent of one's productive time for a period of ten years might have been salvaged.

I was beginning to feel for the first time that progress was being made in treatment problems. Patients, their parents, and the family dentists were ap-

Fig. 14

Fig. 15

proving the end results that were attained. A common remark from the dentist was, "Thought you orthodontists would finally tumble."

About eight years ago, while reviewing the cephalometric literature, attention was focused upon some of the lateral head tracings made by Broadbent with the cephalometer, and Margolis with his cephalostat. Of particular interest were the tracings of their normals. They certainly presented beauty and harmony of proportions. These beautiful tracings of normals were compared with others that were abnormal. A mental game was started that went like this: White and Black certainly would have face pattern similar to the composites of the 3,500 normals demonstrated by Broadbent (Fig. 14). Yellow and Green certainly would not have beautiful face patterns like the others (Fig. 15). OH! OH! No wonder I could not make them good-looking with the identical treatment that so greatly improved White and Black. This little game resulted in writing the paper, "The Frankfort Mandibular Plane Angle in Orthodontic Diagnosis, Classification, Treatment-Planning, and Prognosis."* Here, at last, was a possible explanation of why about 10 per cent of extraction cases were not benefited esthetically by the identical treatment which had been so successful in the other 90 per cent of the cases.

If the FMPA is between 20 degrees and 30 degrees, the directional growth of the face has approximated the normal. The + or –5 formula for variation of the inclinations of the mandibular incisors will apply to all these cases.

However, the +5 will apply to those cases (Fig. 16, *a*) whose FMPA is 20 degrees and 0 degree (Fig. 16, *b*), to those cases that have a FMPA of 25 degrees. When the FMPA is 30 degrees (Fig. 16, *C*) the correct inclination of the mandibular incisor is –5 when related to the lower border of the mandible. When the FMPA ranges past 40 degrees (Fig. 16, *D*), one is limited in his ability to create balance and harmony of facial proportions.

Facial esthetics in orthodontics cannot be overemphasized because normal occlusion in its correct sense is impossible without a normal face pattern and only when normal occlusion accompanies a normal face pattern is the ultimate in balance and harmony of facial lines possible.

Because of limitations over which man, to date, has no control, normal occlusion can rarely be the end result of orthodontic treatment. However, we should strive for as near an approach to the normal both in denture relations and facial esthetics as limitations will allow (Fig. 17, *a* and *b*). A general rule to follow to accomplish this is as follows: Accept a Frankfort mandibular plane angle of 25 degrees as a norm, and with it an incisor mandibular plane angle of 90 degrees or 0. The FMIA will then be 65° 180° –90° –25° = 65°. For each degree, the patients FMPA varies from the norm 25 degrees, add or subtract one degree from the inclinations of the mandibular incisors. (Example, Fig. 19.)

With a FMPA of 30 degrees, the incisors must be tipped lingually 5 degrees from 90 or to 85 degrees to compensate for the increase of the FMPA from its norm of 25 degrees.

*Am. J. Orthodontics and Oral Surg. 32: 175-230, 1946.

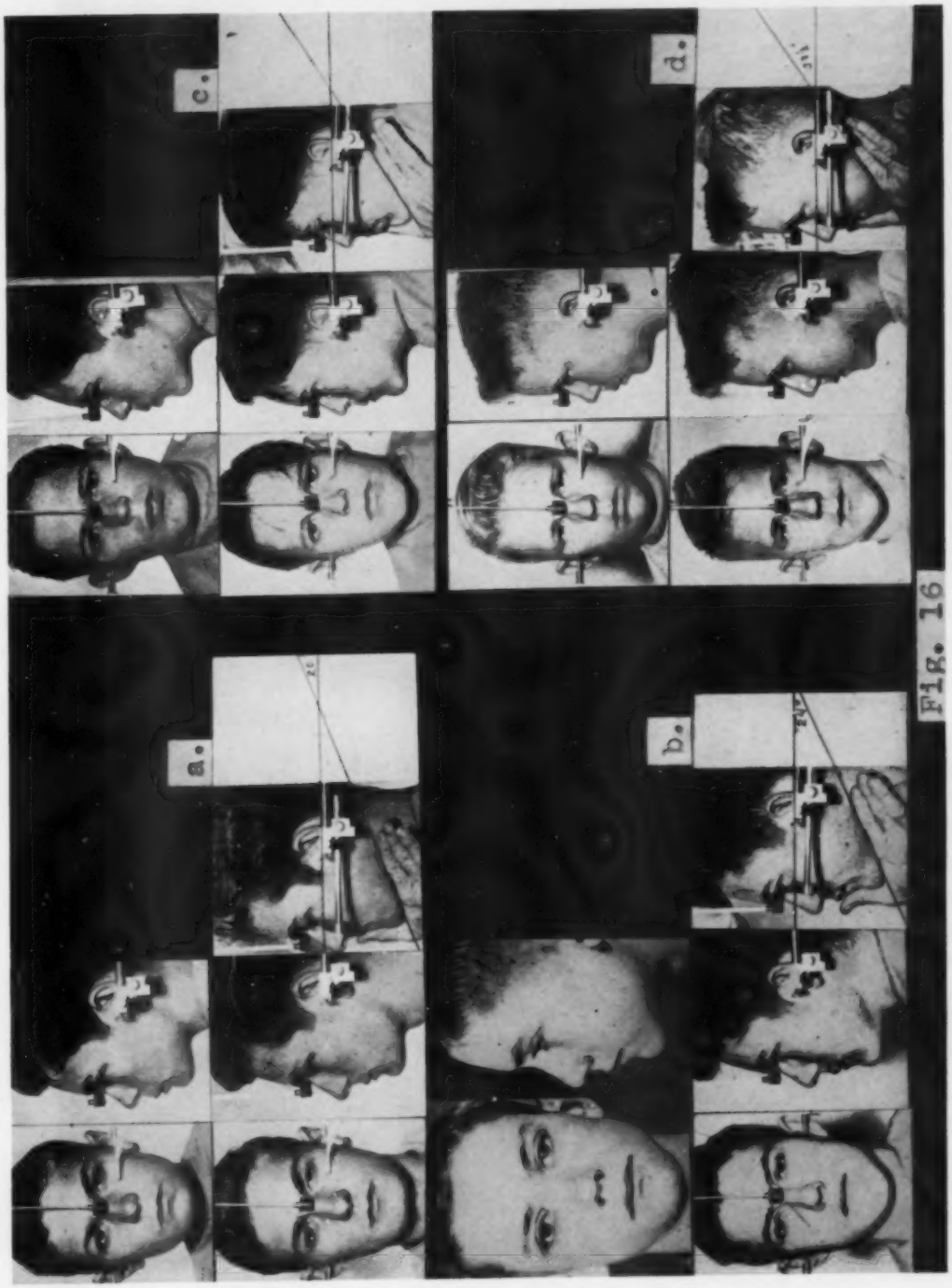

FIG. 16

Fig. 17

For those who have harmonious facial lines as one of their orthodontic objectives, the application of this rule is well worth investigating.

In 1946 (Fig. 18) I suggested that the inclination of the mandibular central incisor be related to the Frankfort plane rather than the lower border of the mandible. If this were done, the correct inclination of the mandibular incisor in relation to Frankfort would always be 65 degrees, provided one accepts a FMPA of 25 degrees and an IMPA of 90 degrees as a norm. The necessity for compensating the inclinations of the mandibular incisors in their relation to the lower border of the mandible for varying Frankfort mandibular plane angles would be eliminated. A FMIA of 65 degrees should be considered the minimum requirement, and any variation should be in the direction of an angle of 70 degrees rather than 60 degrees.

When the FMPA becomes so great that it is impossible to compensate for its large size by tipping the mandibular incisors distally one degree for each degree of increase of the FMPA from its norm of 25 degrees, prognosis is bad, and the orthodontist is limited in his efforts to restore satisfactory facial proportions.

The clinical observations and deductions made by me, that in ideal occlusion the teeth are always upright and over basal bone (Fig. 9), could be discounted as one man's opinion except for the fact that growth studies within the last decade substantiate the observation. Furthermore, Downs, in his analysis, using the material collected by the University of Illinois, gives his mean an angle of 91.4 degrees, and his extremes –81.5 to 97 degrees. In my opinion, his range of variation is too large as the result of basing the analysis on satisfactory rather than ideal or normal occlusions.

Also, my clinical observation (so violently opposed in 1936 and again in 1944) that, at times, extraction is indicated in orthodontic therapy when the teeth are too large for the jaws or the jaws are too small for the teeth (Figs. 12 and 13), could also be discarded as one man's opinion except for the fact that excellent scientific research on the growth of the mandible has indicated that it is impossible to make a base bone grow beyond its genetic potential with orthodontic appliances. And, in 1941, Schour and his co-workers, repeating Brash's earlier work, using alizarin red S. demonstrated that generalized growth of the jawbones is over after the eruption of the first permanent molars and, thereafter, growth in the mandible is confined to the posterior borders of the rami, the head and neck of the condyles, the sigmoid notch, and vertical development of the alveolar process.

Today, the orthodontic profession, due to the excellent research that has been done during the past fifteen years, has been compelled to revise its thinking and operative procedures. In spite of the great progress that has been made in treatment procedures, the clinical orthodontist is not keeping pace with orthodontic research. My reason for so thinking is the belief that the majority of orthodontists have, more or less, accepted the following facts:

1. That in normal occlusion, all of the teeth are over basal bone and the mandibular incisors are upright with their normal inclinations varying from

approximately 85 degrees to 95 degrees when the long axes of the mandibular incisors are related to the plane formed by the lower border of the mandible (Fig. 9).

2. That after the eruption of the first permanent molars, generalized growth in the body of the mandible has ceased, and, thereafter, that portion of the mandible anterior to the first permanent molars grows no more, but is moved forward from growth centers behind these teeth.

3. That it is impossible to make a base bone grow beyond its genetic potential with orthodontic appliances.

4. That the face pattern is more or less fixed by the third month of life, or perhaps earlier, and that we cannot appreciably alter the directional growth of the face.

5. That the evolutionary trend of the denture is from procumbency to uprightness and that it is an error in orthodontic treatment to reverse these trends and displace the denture mesially.

6. That Nance has given us a technique that can and does allow us to determine accurately in the mixed dentition stage whether or not we are dealing with a discrepancy or nondiscrepancy case, and the extent of the discrepancy, if there is one.

7. That the Kesling diagnostic setup, when the technique is carefully followed, will also demonstrate the existence and extent of a discrepancy.

Then, may I ask, of what benefit is science if we do not apply that knowledge in behalf of our patients?

We all have young patients under observation in the mixed dentition stages. We have their photographs, plaster models, and x-rays. Those who are interested in these children have measured the teeth as outlined by Dr. Nance and have made a Kesling diagnostic setup, and know that a majority of them are discrepancy cases that will, eventually, require the removal of some teeth (Fig. 17, *a*), but what do we do? Well, some of us just keep them under observation and casually watch them while they are in the process of developing a complicated malocclusion. Then, after nature has exhausted herself in erupting these teeth as far from the line of occlusion as conditions demand, we are ready to go to work. Some remove the four first premolar teeth, and start moving the displaced teeth back to the very places from whence we so complacently observed them migrate due to their eruptive urge and the fact that we did not intercede and there was no other place left for them to go. Others will refuse to reduce tooth anatomy and will prefer to disregard the findings of Brodie, Schour, and others and forget all about the evolutionary trend of the denture, and will displace the anterior teeth forward and into protrusion to accommodate all these irregular and blocked-out teeth, thus creating a man-made bimaxillary protrusion, a facial disharmony, and, in all too many instances, appreciably reduce the life of the denture.

Now, honestly, is either of these procedures remotely scientific, and, in truth, have we been practicing scientific orthodontia to the best of our knowledge?

Fig. 18

Fig. 19

A close study of the scholarly paper entitled "The Limitations of Orthodontic Treatment,"* written by Dr. Hays Nance, will acquaint anyone with the necessary information concerning when extraction is indicated in these cases. The correct time for the removal of unerupted premolar teeth is best determined by the intelligent use of the x-ray and your knowledge of growth (Fig. 17, *A* and *B*).

If orthodontists will but apply their present knowledge in the interception of these severe malocclusions, nature will do a great amount of the work we now do with mechanical appliances.

I admit that I finally shied away from early orthodontic treatment and advocated awaiting the loss of all deciduous teeth and the eruption of their permanent successors before instituting orthodontic treatment. Not having the Nance analysis to guide me, I could not determine when a case was discrepancy or nondiscrepancy, so I treated all of them, including a Class II case, as early as 38 months, with a full edgewise hookup. All the discrepancy cases were failures and so were most of the nondiscrepancy cases, and why? The over-all leeway space as described by Nance varies from 0 to 6 or 8 mm. in nondiscrepancy cases. This means that arch length in the mixed denture stage measured from mesial of the first permanent molar to the mesial of the other first molar, at approximately 7 years of age when these teeth have just erupted, is sometimes from 0 to 6 to 8 mm. greater in length in the mixed dentition than in the permanent dentition. Therefore, in all those cases that had 4 to 8 mm. leeway space, the distance from distal of lateral incisor to mesial of first permanent molar was too great and the incisors, therefore, occupied positions that were too mesial.

A second period of treatment was required to close all spaces and move the incisors distally to contact the cuspids. The only successes possible were those cases in which the leeway space varied from 0 to 1 or 2 mm. and those cases were few.

Now after twenty-five years in the practice of orthodontics, I look forward into the future with confidence for I am, at last, equipped with the scientific information I feel certain is accurate. I am no longer on the end of the pendulum that has been swinging back and forth. I know that orthodontic treatment should be instituted as early as it is possible definitely to determine where normal ceases and abnormal begins.

The following is an attempt to outline briefly in a mixed dentition case a simple way of diagnosing a discrepancy between tooth anatomy and basal bone and the extent of the discrepancy:

1. The lateral head x-ray reveals that the patient has a FMPA of 30 degrees and an IMPA of 94 degrees. Our accepted norm is a FMPA of 25 degrees, and an IMPA of 90 degrees. (Fig. 19.)

2. The available mandibular arch length from mesial to mesial of first permanent molars is taken from the casts as outlined by Nance and is 65 mm.

*Am. J. Orthodontics and Oral Surg. 33: 177-223; 253-301, 1947.

3. The required arch length from mesial to mesial of first permanent molars is also made and recorded using casts and intraoral x-rays as described by Nance, and is 70 mm.

For each degree greater than 25, the FMPA reads (in this case, the difference is 5 degrees), the mandibular incisors must be tipped distally from 90, a corresponding number of degrees to compensate for the larger than normal angle, if best facial esthetics are to be obtained. Therefore, the mandibular incisors must be tipped distally from 94 to 85 degrees to compensate for the increase in the FMPA of 30 degrees as the case presents.

4. Using the apex of the mandibular incisor, measure off 9 degrees from the line forming the long axis of the mandibular incisor and draw an angle of 9 degrees.

5. At the incisal crown tip, measure in millimeters the 9 degree angle which is 3.5 mm. The crowns of these teeth must be moved lingually to this point to satisfy facial esthetics. The dental arch must be shortened approximately 3.5 mm. on either side for a total of 7 mm. in total arch length. Subtract this 7 mm. from the available space of 65 mm., and available space becomes 58 mm.

6. The case now becomes one of 12 mm. discrepancy rather than 5 mm. as outlined in the Nance analysis.

About two years ago, a Margolis cephalostat was installed in the office, and I regret that this was not done sooner. In keeping with my views on the importance of facial esthetics in orthodontia, my attention has been focused on the FMPA, the inclinations of the mandibular incisors and what happens to the mandible as a result of Class II treatment. For many years I have felt that in some Class II cases it is possible to relocate the mandible forward, and that in some cases it would be a physical impossibility to tip or move the maxillary teeth distally enough to occlude normally with the teeth of the mandible, unless the mandible did move forward.

An examination and comparison of the inclinations of the teeth in both the maxillary and mandibular jaws in the *before* and *after* models should be enough evidence that the mandible must, at times, be relocated forward in Class II treatment. In many of these successfully treated cases, there is but slight change in the inclinations of the teeth in the before and after casts. Fig. 20 is the tracing of the first Class II case completed since the installation of the Margolis cephalostat, and the evidence seems to be that the mandible in this case was relocated forward due to orthodontic treatment procedures. Another important use I have found for the machine is determining when anchorage preparation is complete in the mandibular arch. This is a very important step in treatment, assuming, of course, one has satisfactory facial esthetics as one of his orthodontic objectives. The fact that some operators, who do not prepare anchorage, routinely remove all four first premolars in Class II treatment because, as they argue, intermaxillary traction during Class II treatment displaces the mandibular denture forward, should be proof enough of the importance of anchorage preparation. The percentage requiring extraction of teeth in the treatment of Class II malocclu-

sion, when the mandibular teeth are regular, should be less than any other type of malocclusion, if anchorage is prepared properly in the mandibular arch.

You have, perhaps, noticed that while some operators attain beautiful occlusal relationships in most of their cases, there is but slight beneficial change in

Fig. 20

Fig. 21

the facial esthetics of their patients. Other orthodontists, whose cases do not display finesse of beautiful occlusal relationships, seem to be more successful so far as balance and harmony of facial lines in their finished cases are concerned. Why? The man creating the pleasing facial changes is preparing anchorage bet-

ter, and is tipping the mandibular teeth more distally than is the other fellow. For example, select a Class II case with a FMPA of 30 degrees and an IMPA of 95 degrees or +5. Let us presume that in treatment the mandible has been relocated forward without changing the IMPA which is 95 degrees. Chin point has been moved forward somewhat. Visualize the same case but before moving the mandible forward, the orthodontist has first tipped the mandibular denture distally 10 degrees so that the incisal inclination is 85 degrees rather than 95 degrees. Use the apex of the mandibular incisor inclined at 95 degrees and make a 10 degree angle. At the incisal edge, measure in millimeters the distance of the 10 degree angle. The mandible and chin point have been advanced that much more than would have been the case if the mandibular denture had not been tipped distally 10 degrees before relocating the mandible forward.

Now, let us suppose the mandible remains constant in its relation to a fixed point in the head and does not move forward in treatment. If the mandibular teeth are tipped distally 10 degrees and the maxillary teeth have been moved distally to occlude normally with the mandibular teeth, the denture, in its relation to its bases, occupies a position as much more distal as the measurement in millimeters of a 10 degree angle as described above. This results in accentuating mandibular prominence and will result in better balance and harmony of facial lines.

I agree that we cannot appreciably alter the basic pattern that presents itself for treatment, but the ability to possess a mental concept of how to rearrange the associated parts in a patient whose face pattern presents deviation from the normal, to give that individual the best facial esthetics possible, is something no orthodontist should cease to strive for.

For example, the young lady in Fig. 21 presented herself for treatment. Records, including photographs, x-rays, and models were made. The headplate, taken after treatment, revealed the face pattern to be abnormal. The FMPA is 50 degrees. The photograph was taken to an artist with the request that he draw his concept of the esthetics possible for the lower part of this patient's face. This is the sketch he made. It was filed away and completely forgotten until months after treatment was completed. Note the close similarity between the artist's concept of the possibilities of this face, despite the abnormality of the facial pattern, and the end result of treatment by the orthodontist whose concept was similar to that of the artist. With such evidence, how can anyone advise against comparing every face that we see with some mental image that is pleasing to us?

My life in orthodontia has been spent in an endeavor to make balance and harmony of facial proportions an important part of the science of orthodontia. (Figs. 22, 23, 24, 25, and 26.) We are doctors, and one of the most important duties of all doctors is the alleviation of pain. Pain can be either physical or mental and mental anguish is often more difficult to bear than is physical pain. One of the most heart-rending letters I have ever read came to me indirectly from a Filipino in 1933:

> Since 1927, my twelfth year, until now I've been constantly watching the growth of my jaws. To my great disappointment, my jaws in spite of all my efforts to prevent it,

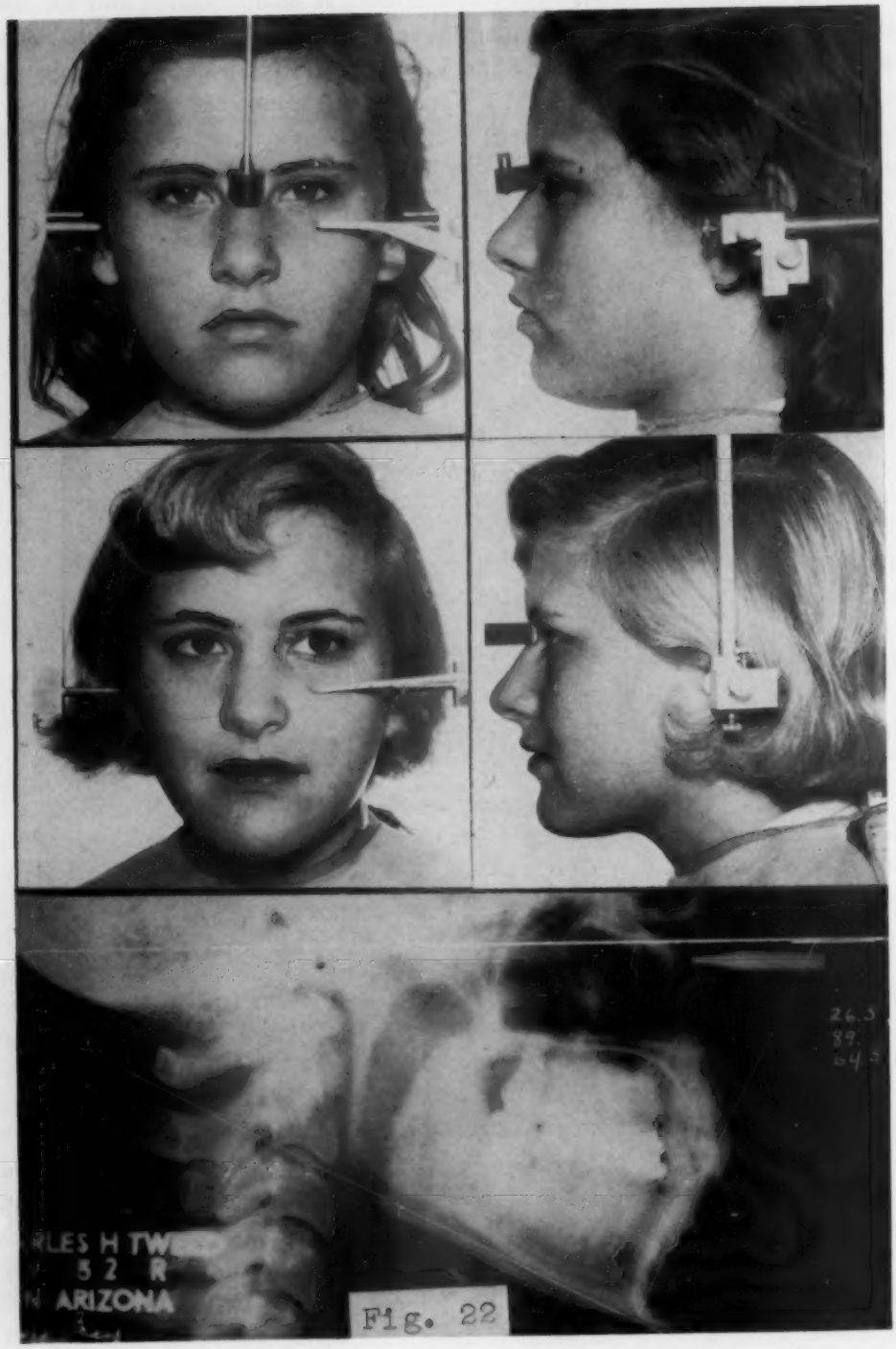

Fig. 22

Fig. 23

Fig. 24

Fig. 25

slowly and slowly grew outward to such an extent that my lips are always held open, and deforming the true expression of my face. I approached a dentist here in my town, but nothing worth satisfaction was done.

I would not have been to worry very much over this matter for the reason that perhaps it is my family's inheritance, but as it made me quite ashamed to face other people, thus retarding my social dealings with others and robbing me greatly of one of my greatest assets—personality—I cannot but turn to you and beg your most sincere heart to please tell me, of what am I going to do in order to prevent the growth or possibly to restore it to its right position.

I write to you early before it is going to late, I herewith enclose an envelope with stamp for your kind reply.

Fig. 26

Strange what influence such a letter can have on another's life. I wonder whatever happened to G. A. I wonder how many children there are who are thinking the same thoughts that G. expressed in writing (Figs. 4 and 6). I wonder.

This world should be a beautiful place for a child to live in. If he is handicapped by a facial deformity that is marring his happiness, we should try to move heaven and earth to restore that happiness to him, if at all possible. To hide behind the word "type" because it is the easiest way out, or assume that because a face pattern has serious abnormal deviations there is no use trying to help the patient, is not the courageous attitude to take. We must accept the fact that normal occlusion and perfection of balance and harmony of facial lines are impossible in such cases, but there is nothing but ourselves to prevent us from striving for as near an approach to the normal as conditions will allow. Sometimes just a little improvement will do wonders for a child (Fig. 15).

These are some of the thoughts that have been evolving in the mind of a fellow orthodontist these past twenty-five years and some of the efforts he has made to advance the art and science of orthodontia.

Allow me to repeat that there have been great changes in our orthodontic thinking due to the excellent research of the past fifteen years. Not until clinical orthodontists direct their energies and techniques along the avenues dictated by modern proved research will there be less harsh mechanics and more applied biology in the art of clinical orthodontics.

In closing, let me remind you that ours is a fascinating profession. For the past two generations we have seen the aftermath of war, which is destruction, death, and crippling. Ours is the reverse—the creation of the beautiful in the living (Fig. 3), and we are, indeed, fortunate to be among those who deal in living and beautiful things—let us deserve all this.

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A REAPPRAISAL OF LABIOLINGUAL THERAPY

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IN BEGINNING our second half-century as an organized branch of dentistry it is certainly fitting that we reconsider various ideas, techniques, theories, etc., which pertain to the successful practice of orthodontics. Certainly, it is gratifying to be present at so fine a gathering to help start the second fifty years after the great strides which were made during the first. These were certainly stormy, trying times, and it is with a great deal of personal pride that I have been able to contribute my part to continuing the growth and development of this organization and of orthodontics as a branch of dentistry in order that we might today be a solid, unified group.

As the American Association of Orthodontists has had to weather many stormy sessions, even threats to dissolve the organization, so the practice of orthodontics has had wide, varying views and radical ideas presented from time to time. In my presentations as in my practice over these years using the labiolingual technique with modifications, variations, and additions, I have tried to follow a rather middle of the road course and not diverge too far in one direction or another from what we know to be sound, basic orthodontic practice. I feel that the labiolingual technique is still the soundest technique physiologically, mechanically, functionally, and with regard to practical application of any of the techniques.

A rather thorough examination of the history of orthodontics will clearly point out to us that there are not very many new things in science today. We have benefited from the great pioneer work done by many of those before us, such as Bonwill, Farrar, Jackson, Lourie, Angle, Case, and others. With better information, research weapons, materials, techniques, and experience, we, of course, should be better orthodontists as a whole than were the earlier pioneers. These men were leaders, however, who were not satisfied with what the profession had been but pushed to new achievements. We, who followed closely behind, also have striven to do the same; and it is with earnest sincerity that I pass this challenge on to the younger men today.

We all know and understand some certain biological principles but do we know and understand biologic effects of the particular appliance we use? Are we positive that their reaction is in keeping with proved biologic principles? It is high time we quit matching mechanics against the biologic and match mechanics with the biologic. Basic truths still hold. The late Dr. Milo Hellman, an unquestioned authority on biologic research, stated in a personal letter,

Presented at the Forty-eighth Annual Meeting of the American Association of Orthodontists, St. Lous, Mo., April 22, 1952.

"In my estimation an appliance to be the least harmful must, to begin with, exert slight effects upon vital tissues. Then it must also allow time between those periods of effective action so as to enable the tissues to regenerate. Then also the fact should be heeded that an appliance accomplishes more and does less harm during periods of normal active growth and differentiation than during periods of rest."

Dr. Albin Oppenheim remarks in a printed article, "My histologic evidence which seems to prove the points (1) that the application of light forces is correct and preferable in orthodontics; (2) our work should be performed so as to give Nature ample time for compensatory formation of osteophytes for the same reason the osteoid on the traction side is laid down in an even layer and is of greater thickness by the reduction of the width of the periodontal membrane and on account of the greater resistance of osteoid to resorption the extent of an always possible relapse is greatly limited; (3) only light forces are able to produce an abundancy of the primary osteoclasts which alone can be considered our real helpers. They alone work without creating too great damage if any at all. These primary osteoclasts are the principle factor in bringing about all the marvelous and revolutionary changes without clouding the prospects of the future."

Certainly, today, the labiolingual technique is not absolutely ideal or perfect. It is not universal, nor automatic, nor absolutely physiologic in all cases. In present-day orthodontics there is no appliance known and used which in all respects can be scientifically classed as universal. or is there any appliance when placed that can do the thinking, adjusting, or prove automatic in its application. I do, however, feel that the labiolingual technique is the most ideal appliance to use and can be made to produce the closest to individual physiologic activity of any technique. In my hands this is certainly true.

When properly used and fabricated, the labiolingual technique can very nearly meet all the classic standards of the ideal appliance. These appliances are stable and durable. They may be constructed with comparative ease, they are easily placed in the mouth, and are manipulated in a very smooth manner in keeping with simplicity, which is easy on the patient and on the operator. There is a very minimum amount of time necessary to adjust these appliances. They are clean and are as comfortable as appliances in the mouth can be. They are probably the least conspicuous of appliances used in present-day orthodontics. Most important of all, the labiolingual technique is an efficient technique. These factors all lend themselves to reduced cost for orthodontic service. Consequently, more patients may be assisted in their quest for orthodontic treatment.

There are certainly many other excellent types of appliances. Nearly all are similar in both design and function, although diverse claims and statements have been made to favor or discredit each in turn. This is certainly not a healthy standpoint or attitude to be taken in a profession such as orthodontics. Actually, nearly every so-called technique employs a labial arch of some sort. These, however, are not always used in conjunction with each other at the same time. Various forms of labial arches are found whether they be known as the

round labial arch as considered in this technique, the twin-wire labial, the Universal appliance, the edgewise appliance, or something else. In a similar manner, the lingual arch appliance is used in nearly all techniques in one form or another, whether it be soldered or removable, solid or tubular, one piece or sectional, wire or acrylic type.

Best results with the greatest amount of regard for anchorage and reinforcement of anchorage can be gained by using the labial and lingual arch appliances at the same time. The lingual arch appliance is usually used for control and movement of units in the posterior segments of the arch. The labial arch, on the other hand, is the appliance of choice in manipulation or movement of dental units in the anterior portion of the arch. Even when correction is desired only in one portion of the arch, whether it be anterior or posterior, it is advisable most of the time to use both the labial and lingual arch appliances together. This, of course, is to facilitate reinforcement of anchorage, thereby minimizing any tendency to have tipped molars or other undesirable displacement of dental units.

Many who are not familiar with the labiolingual appliance treatment labor under the misapprehension that the molar bands which are placed usually on the first permanent molars are the only attachment or only anchorage in this technique. This is certainly not true. Consequently I feel that often the term "anchor teeth," applied when meaning the first permanent molars, should never be used in conjunction with any discussion of the over-all case. Rather, these should be referred to as the principal attachment teeth. In order to have this attachment as nearly ideal as possible, it is necessary that molar bands be individually constructed for each of these teeth.

Under no circumstances should an anchor attachment or attachment band be used for these molar teeth without being individually tailored for them. No two molars are exactly the same, and even were this possible it would not be worth the chance taken in using preformed bands of any sort. These molar bands should be so constructed that when an attempt to seat them is made with a band driver, they go into one position and one position only. No matter how many times they are removed and replaced, these bands should not impinge on the soft tissue or subgingival tissues, nor should they impinge occlusally so as to interfere with normal occlusion. They should be contoured to follow the anatomy of the tooth structure itself, and should fit so closely that there will be practically no visible cement line. Placement of tubes on the attachment or molar bands should always follow, as nearly as possible, an ideal resistance to undesirable leverage or torque movement tendencies. This is most nearly accomplished by the placement of the half-round or lingual tube so that it is parallel to the long axis of the molar tooth. The buccal tube is placed as nearly as possible at right angles to the long axis of the molar tooth. Also when using the round labial arch, this is necessary, and, as nearly as possible, is necessary in any technique employed.

Of course, I realize when using the twin arch labial, or other labials, it is not always possible to follow this very simple basic principle of anchorage.

However, when these round tubes are not placed at right angles to the long axis of the tooth, there is always an increased tendency toward force from leverage in one direction or the other upsetting anchorage. By placing these tubes at this perpendicular, the torque or the leverage from either occlusal or gingival sources may be most nearly dealt with with the greatest resistance. As we all know, anchorage at best, in dealing with orthodontic problems, is a relative resistance to an applied force. There is no such thing as fixed or stationary anchorage; consequently, we must be ever-cautious not to abuse that anchorage which we are able to use successfully only when biologic principles are not violated.

In considering the lingual arch appliance, it is necessary to discuss somewhat the history of the appliance in orthodontics. It did not come into being or use until a considerable number of workers in dentistry and orthodontics had worked with it and through it for many years. Many of these pioneer workers did original work so far as they know and they were quite uninfluenced by each other. Probably a good many dentists employed some form of the lingual arch before the later orthodontists, from whom we have reports, began the recorded utilization of this appliance in orthodontic therapy. Farrar, back in 1888, included many illustrations and explicit directions for making and using the fixed and removable lingual arch appliances, as well as for employing many other types of bands, appliances, and fundamental principles which are daily employed in present-day orthodontics.

Dr. Lloyd Lourie, of Chicago, successful student, orthodontist, and teacher, used the lingual arch both as a removable and a fixed appliance as far back as 1903, but did not then receive published recognition. The reports of his work were sent by him to Dr. Angle for publication, but for some reason were not published; consequently, many were not aware of his part in the early development of this appliance.

Dr. John Mershon, a good student and an original thinker, also had very great success in the early use of the lingual arch appliance. He is generally credited with developing the half-round tube and post which he is using today. He is also responsible for the inception of the present-day auxiliary spring as he now uses it. Dr. Mershon, of course, has been a leader in many other developments of our specialty as well, and has certainly endeared himself to us all. Many, many others, including myself, have continued with elaborations, improvements, and refinements on the lingual arch until today its advantages and indications are appreciated by orthodontists everywhere.

In my own practice, I feel that the lingual arch appliance may best be likened to a stable platform having four principal points for stability and, in addition, using nearly every tooth in the arch anterior to the first molars for stability. This stability is accomplished by a more square design for a lingual arch appliance than is commonly used by many successful orthodontists. I feel that rounded right angle turns in approximately the cuspid region have a great deal more stability than do the more horseshoe type lingual arch appliances. When properly fabricated, my choice of lingual arches is certainly very emphatically in favor of the removable lingual arch appliance. This is for various

reasons, principally because control, adjustment, and ease of manipulation are of paramount importance, and when constructed so as to take advantage of the entire dental complement, the removable appliance has equal stability to that of a soldered lingual appliance.

Too much emphasis, of course, cannot be used or applied when discussing the anchorage problem. One of the main problems is the fact that the slightest amount of pressure exerted upon any teeth, if continued sufficiently long, will result in tissue change which will allow the teeth to move as a result of that pressure. The teeth employed as anchorage will be influenced, as well as those intended to be moved, and it is the duty of the operator to design an appliance which will create desirable movements in the anchor units and obtain the desired results. The very nature of malocclusion is such that when the appliance rests on, or touches, the malposed teeth, it must be in such a manner as to allow all the functions of mastication to be performed. One consequently must be very careful and not use such secure and binding attachments that the appliance becomes so rigid as to interfere with normal physiologic growth and development of the child.

Auxiliary springs of gold wire of very small diameter are the materials of choice at the present time. These are easily constructed and certainly can be well regulated, so that individual pressure of a desired amount may be placed on any or all teeth at one time. As far as I know, there is no other appliance or auxiliary of any type which gives the perfect control and amount of applied pressure that can be obtained with individual auxiliary recurved springs. It must be remembered that when auxiliary recurved or other type auxiliary springs are used, there is an equal or opposite reaction to any action which they may have. To neutralize this in a large measure we employ a rather large lingual arch appliance of .040 inch in diameter. This is a rather rigid appliance, and that is as it should be. This appliance in itself is merely the base or stable structure from which the auxiliary springs are activated. The auxiliary springs are usually of wire .020 inch in diameter or less. If expansion is desired by use of the auxiliary recurved springs, of course, a very, very slight adjustment in the buccal direction should be made against the molar teeth so that these are not displaced lingually by the reaction or are not left behind when the premolar and cuspid teeth are moved buccally.

Even as a great deal of care is taken so that the lingual and buccal tubes are placed with greatest resistance to undesirable forces, so also must the lingual arch appliance be equally carefully constructed. This most desirable form is such that the lingual arch is in a single plane when observed, noting it from an occlusogingival or horizontal view.

The labial arch appliance is certainly very widely used, and I feel is probably very widely abused in all techniques. This appliance should not be constructed so it merely follows approximately the desired arch form. Instead, it should be a carefully constructed appliance which will minimize any tendency toward undesirable displacement of one or more dental units. Since the labial arch appliance is used mainly for reinforcement of anchorage, and for control of

anterior teeth or movement of anterior teeth, it also should be constructed as nearly as possible in a single plane, or, rather, with bends in a single plane, so as to again control more completely any undesirable torques or leverage tendencies.

The labial arch appliance is generally constructed so that it has contact only with the anterior teeth. It, of course, must not stand out a great deal from the premolar or cuspid teeth since it would have a tendency to irritate the soft tissue of the buccal mucosa. It must not press upon the teeth, however, whether or not expansion is desired. It still should permit individual physiologic movement and development during growth so that proper occlusion can be attained by biologic response with our mechanical therapy.

In the treatment of individual cases there are certain basic types of development and tooth movement which are necessary. The types most commonly needed are lateral development, vertical development, correction of both open and closed bites, anterior development of the maxillary and mandibular arches, retraction of the mandible, anterior movement of the mandible, retraction of the mandible, anterior segment, distal movement of posterior teeth, and individual tooth movement, such as rotation, elongation, and depression. There is not one of these basic movements that the labiolingual arch cannot handle physiologically and satisfactorily. This treatment may be handled in both primary, mixed, and permanent dentition with similar ease, no matter in what stage of development the patient may be. Intermittent or continuous treatment can be handled with facility with the labiolingual technique. Of course, every case should be based upon its individual merit and upon the individual norm for that particular person, and in the course of handling a successful practice, all types of treatment and all stages of development are met.

In my mind, the labiolingual technique with the improved materials now at our command still has no peer with regard to versatility for varied types of cases needing treatment. Auxiliary springs with very gentle pressures may be used for controlled movement such as expansion or individual tooth movement, rotation, retraction, or protrusion. The introductin of good dependable precious metal has meant a great deal in treatment with the labiolingual technique. This metal is particularly desirable since a piece of gold wire of approximately the same diameter as that of stainless steel has nearly twice the flexibility. Breakage is also easily dealt with in using this precious metal material. A much more gentle continuous force may thus be applied.

Intermaxillary hooks, both for treatment of Class III types of cases and Class II types, may be used with the labiolingual appliances. These appliances may be used in treating cases of any age from 2 on without a great deal of variation being necessary. This technique may be employed in open or closed bites and may be used in treating the severest types of cases of malocclusion.

One of the chief auxiliaries of the labiolingual technique is the occlusal guide plane. This is not an appliance in itself but is a very necessary adjunct to treatment and is an auxiliary, even as various springs are auxiliaries, in the labiolingual treatment. The occlusal guide plane has been defined as a mechani-

cal device having an established inclined plane which, when in use, causes a change in the occlusal relation of the maxillary and mandibular teeth and permits their movement to a normal position.

This device should be differentiated from such others as the bite plate or the bite plane. A bite plate is a form of plate which the teeth forcefully engage in closure. A bite plane is defined as a form of plane, the material substance of which the teeth forcefully contact when occlusing. The occlusal guide plane, however, should not be confused with any of these types of appliances. It is constructed so that when the jaws are brought together the incisal edges of the mandibular incisal teeth are guided forward into a new occlusal relation. They do not forcefully engage the occlusal guide plane, as is the case with the other appliances which were designed previously.

The occlusal guide plane, as we know it today, is a new and different appliance from any type of appliance used in the past for similar purposes. Its idea, on the other hand, is in no way original; nor has it ever been claimed as such. Kingsley, in the mid-nineteenth century, wrote about the use of the inclined plane in primary treatment, but warned of its inadequacy although he recommended it for retention. This, of course, was a bulky vulcanite bite plane, rather short, and certainly not the precision type of appliance which we are describing. Later, Case and, of course, many others described other various types of bite planes which were considered failures in primary treatment.

The occlusal guide plane has evolved from a long period of thirty years of trial and error, and during the last fifteen years has been used much in its present form by more and more orthodontists in various sections of the country with remarkable success. Possibly one of the biggest reasons for failure of the occlusal guide plane, when this does occur, has been the failure of the operator to construct properly the fundamental labial and lingual appliances.

The purpose of the occlusal guide plane is to obtain a change in the structural relation of the oral cavity and to aid in the establishment of a correct anterior-posterior relation of the teeth and arches. When properly constructed, the patient cannot bite posterior to the occlusal guide plane, but instead on attempting to occlude he will be guided along the incline of the guide plane into a forward positioning of the mandible. The occlusal guide plane is never forcefully engaged by the mandibular incisors when closure is made. Instead, after guiding the mandible forward into its new position or a more normal relation to the maxilla, the guide plane itself will act as a passive block when the teeth are in occlusion. The force of occlusion is carried by the anterior teeth. The occlusal guide plane should rest very lightly on the lower lingual appliance or be slightly anterior to it and touch the lower lingual appliance from center of cuspid to center of cuspid when the teeth are in occlusion.

In nearly all of those cases in which the mandible is positioned forward, the posterior teeth are brought out of contact with those opposing units in the other arch. A forward displacement of the mandible will tend to cause the lower anterior teeth to bite up on the upper anterior teeth. This forward positioning is therefore of great benefit in many, many types of cases other than the

typical Class II. Division 1 case, with which the guide plane is most often associated. This unlocking of an undesirable relation is one of the greatest assets or advantages which the occlusal guide plane can produce in our treatment of cases. Indications generally may include nearly all cases which have been classified as Class II, Division 1, type of malocclusion. In these cases intermaxillary elastics are worn in conjunction with the occlusal guide plane, at least on commencement of treatment. Class II, Division 2 cases with an extreme closed bite are also quite often indications for use of this plane. In some extreme cases it may be necessary to move these maxillary anterior retruded teeth labially before the occlusal guide plane is used.

Border line Class I and Class II cases and those which fall in the subdivisions of Division 1 and Division 2 of Class II cases may be treated with the use of this auxiliary with great success. Generally speaking, it may be said that contraindications in a large respect would include any other type of case. Definite contraindications, of course, would include any Class III type of malocclusion since the malrelation of the arches is reversed. Another definite contraindication for the use of the occlusal guide plane would be any case where there is an open-bite present or a tendency toward an open-bite.

In my opinion, there are several very definite reasons why the occlusal guide plane is succeeding daily in my practice as well as in many others where other similar appliances have failed. First, the occlusal guide plane is a fixed removable appliance; consequently it remains in the mouth and functions at all times when the patient is absent from the office. Many of the so-called inclined planes now being used are those attached to the so-called Hawley type removable appliance. The patient may remove this at will and consequently is very prone to establish a "dual bite." There can be no permanent change without perfect cooperation in these cases. This may be likened to the treatment of a fracture in which the splints are removed approximately once a week and the fractured segments moved about. There is never a permanent healing in such cases. Second, the occlusal guide plane is a precision appliance and is so constructed that the patient can occlude in one position and one position only. Third, the occlusal guide plane being constructed of metal, a nonbulky type material, is designed so that it is long enough and deep enough that the patient cannot bite behind it and therefore again must always occlude in only one position. Fourth, the occlusal guide plane may be used in conjunction with all other adjunctive corrective treatment desired. Malposed dental units may be moved into a functional occlusion coincidental with the repositioning of the mandible.

Clinical evidence for thirty years has supported the contention that pathology is not created by the use of this appliance. Clinical evidence also has supported the claim that dual bites are not established and that correct occlusion once established and with normal maintenance time will function normally and maintain itself over a period of years and is not a pseudo adjustment of the relation of the mandible to the maxilla.

Lunsford, Terry, and others have made scientific investigation to determine exactly what qualitative changes take place in these cases. Their work was done by re-examination of patients who had been treated with the occlusal guide

plane some years previously. Later studies were made with beginning cases and periodically during treatment. In this work x-ray pictures are made of the temporomandibular articulation before treatment. These show the head of the condyle in a normal position in relation to the glenoid fossa. Other temporomandibular pictures were made immediately after placement of the occlusal guide plane which causes the forward positioning of the mandible. In these cases, the head of the condyle was found to ride forward partially out of the glenoid fossa and slightly down on the articular eminence. After four to eight months with the new occlusion firmly established in the ideal age group, the x-ray pictures of the temporomandibular articulation showed that the head of the condyle was again in a normal position in the glenoid fossa, although the new occlusion was established and maintained. This would certainly clarify the reason that there is no dual bite in these cases. This investigation is continuing and rather definite and encouraging findings have resulted. These findings are similar in nearly every case. Thus far, there seems to be no evidence of pathology at any time during treatment and certainly, in those cases in which x-ray pictures have been made even five and ten years after completion of treatment, there has been no pathology of any sort evident.

Careful study of growth and development of bone and its reaction to stress and strain would indicate that there is certainly the possibility of some change in the glenoid fossa itself. Very likely, the major change would be in the head and neck of the condyle as there is a very active growth center of bone in the head of the condyle which may remain potentially active until over 30 years of age. A true permanent change has been made in the neck of the condyle and in the whole arrangement of the mandible, once the normal occlusion has been re-established. The question arises as to how it is possible to reposition the mandible forward and maintain it there if the muscular balance is disturbed. Again, careful clinical observation would show the following: Before treatment nearly all of these cases show the appearance of a very flaccid, poor tonal quality of musculature beneath the mandible. Immediately after the occlusal guide plane is placed, this initial forward positioning of the mandible tends to relieve this flabby condition. Rather than subjecting the musculature to an unnatural pull, I feel certain from clinical experience during these past years that this repositioning is actually placing the musculature in a better balance and bringing into play muscles which previously had been in poor tone or were actually poorly used altogether.

Very preliminary work with cephalometric x-ray investigation done by Dr. William Brandhorst, of St. Louis, has tended to indicate that, with the use of the occlusal guide plane and intermaxillary elastics, the entire maxillary posterior dental segment seems to be moved posterior in the maxilla. There is some forward displacement of the lower dentition; consequently, the total movement or forward repositioning of the mandible is not as extreme as was indicated originally. This, of course, would even strengthen the advocation of the occlusal guide plane as an adjunct to treatment, since without extraction the so-called tendency of maxillary protrusion is being overcome in conjunction with this forward positioning of the mandible.

When we fail to get desirable results, we should remember that it is not the failure of the appliance, but more often the fault of the operator in his diagnosis and application of the appliance. Any patient, of course, who is non-cooperative will tend to hinder successful treatment, as is true with any other type of appliance. Of course, in all the uses of the occlusal guide plane, just as with any other appliance, regardless of rules set forth, some degree of common sense in application is necessary. It is not within the province of laws of man to meet in every instance, without variation, the requirements of nature.

Materials used with the labiolingual technique as employed in modern practice would include the following: Labial and lingual arch wires of precious metal and .040 inch in diameter, loop stops of the labial arch wire, .022 inch in diameter, lock wires for the lingual arch wire of semiprecious soft material, .025 inch in diameter, recurved springs for buccal displacement of one or more posterior teeth, .020 inch or .018 inch in diameter, loop springs for moving a unit either anteriorly or posteriorly, .022 inch in diameter, intermaxillary hooks, .035 inch, occlusal guide plane outline wire, .030 inch, filigree wire for lacing of the occlusal guide plane, .022 or .025 inch, and molar band material, .007 by .137 inch.

In recent years, as in the past, many so-called philosophies and theorems have been proclaimed which would attempt to make us believe that certain arch forms are absolutely necessary and desirable for a "completed" orthodontic case. What sheer folly this is! We cannot dispute the statement made some years ago by Dr. W. W. Woodbury, "In the long run nature takes charge of every case."

Every true, conscientious orthodontist knows that no case will stay as perfect as we desire. Many improve a great deal after we mechanically position the teeth where we think nature originally intended them. Every case changes throughout its life span. Living beings grow and develop to a certain point, are more or less stationary for a certain time, and then regress as they grow older. Certainly, no man is foolish enough to think that the teeth are the only stable units in the physical make-up of man. There has been a great deal of foolish writing and discussion advocating changes of facial appearance and changes of developmental patterns. This has led to some unwise extraction of teeth and radical treatment of cases which if left alone would very likely have been better off than if treated with careless disregard to the long-range program. I dare say, in this large gathering here, there are very few who have had the benefits of orthodontic treatment, and yet as we look around the audience how few there are, if any, who could be classed as so-called dental facial cripples. There are certainly plenty of us who would have benefited by orthodontic assistance; however, there are very few who have obvious facial deformities which any extraction would have helped at all. Certainly nature has taken care of us in a manner for which we all should be thankful.

In summarizing, I feel that since the labiolingual technique has been used successfully and with pleasing results for a number of years, it must be based on sound basic principles. Its practical application has proved it to be of great value in the correction of orthodontic pathologies and malocclusions. It,

in itself, is constantly being changed and improved upon. Results obtained from the judicious, practical application of the labiolingual appliances are equal or superior to those obtained with any other appliance. Our second half-century as an organized branch of dentistry has a definite place for the labiolingual technique.

In closing I quote, "To do the right thing at the right time; to do something better than it was ever done before; to eliminate error; to know both sides of the question; to be courteous; to be an example, to work for the love of the work; to anticipate requirements; to develop resources; to recognize no impediments; to master circumstances; to act from reason rather than rules; to be satisfied with nothing short of perfection."—The author is unknown.

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THE SUPERIOR LABIAL FRENUM AND THE MIDLINE DIASTEMA AND THEIR RELATION TO GROWTH AND DEVELOPMENT OF THE ORAL STRUCTURES

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INTRODUCTION

THE continued inquiries regarding frenectomies that reach an orthodontist's office from parents, dentists, and oral surgeons, alike, are evidence of a persisting interest in the relationship of the superior labial frenum to the midline diastema.

The purpose of this paper is an attempt to clarify the subject by bringing together a study of the literature, measurements and photographs of plaster casts of patients, and the results of surveys made of orthodontists and oral surgeons.

The plan is to describe adequately the superior labial frenum as a normal part of the oral cavity, to discuss the abnormal frenum, to consider the reasons for the presence of the midline diastema, to discuss the effects of the normal processes of growth and development on the superior labial frenum and the midline diastema, and to present the current status of frenectomies as reported by respondents in recent surveys.

THE NORMAL SUPERIOR LABIAL FRENUM

Embryonically, the superior labial frenum appears to be developed from the frontonasal process[8], and it begins to take form in the fetus at a relatively early stage. Within the first few months of fetal life, it emerges as a part of the oral cavity, along with the lips and the cheeks.[33] As growth and development progress, a prominence begins to appear in the middle part of the inner zone of the upper lip, and this becomes the tuberculum. About this time, another prominence forms on the anterior part of the palate and develops into the palatine papilla. A continuous fold of tissue, the tectolabial frenum, connects the tuberculum with the palatine papilla. (Fig. 1, *A*.) It is interesting at this time to note that the tectolabial frenum of the fetus simulates the abnormal frenum of postnatal life, in that it extends as a continuous band of tissue from the inner aspect of the upper lip, over and across the alveolar ridge, to be inserted in the palatine papilla. Normally, however, the growing alveolar process causes a severance of the continuous fold of tissue, dividing

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it into a palatal and labial portion. The palatal part corresponds to the palatine papilla, and the labial tissue becomes the superior labial frenum, extending from the lip to the crest of the alveolar ridge.[35] (Fig. 1, *C*.)

Histologically, Noyes[34] studied newborn infants and found that the frenum is composed mostly of connective tissue, with a few striated muscle fibers which arise from the muscle bundles of the lip on either side of the midline and pass in a diagonal direction medially and posteriorly but do not reach the alveolar process. The loose character of the fibrous connective tissue becomes more regular in arrangement with strands lying in an anteroposterior direction as it nears the alveolar attachment. In the labial portion there are mucous glands in the subcutaneous tissue on either side of a central artery and vein that lie near the muscle bundles of the lip. This artery and vein have branches which are given to the frenum and these travel in an anteroposterior direction, providing the blood supply of the structure. Nerve filaments accompany the vessels. The posterior fibers terminate by ramifying with the connective tissue

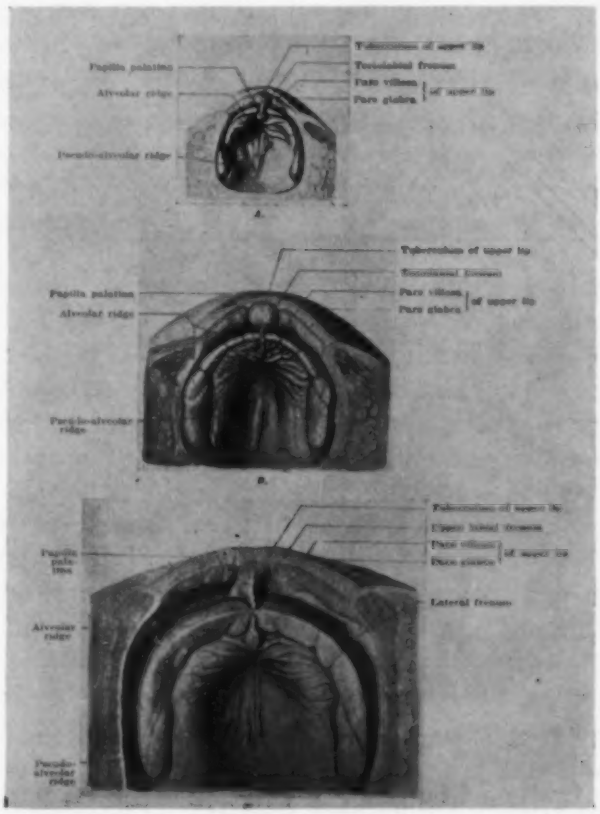

Fig. 1.—Stages in the development of the hard palate showing change from tectolabial frenum to superior labial frenum. *A*, Human fetus, 3 months old, *B*, human fetus, 4 months old, *C*, human newborn infant. (Sicher and Tandler.[42])

of the alveolar crest and its anterior surface. Anderson[1] and Dewel[18] give very similar descriptions, except that Anderson makes no mention of muscle fibers, and Dewel says that there are none in the frenum.

Anatomically, the superior labial frenum is described by various authors.[15, 22, 34, 40] The origin of the frenum is at the midline on the inner surface of the upper lip. Ordinarily, the origin is wide, and it presents a smooth septum which narrows in width as it progresses posteriorly to be inserted at the midline in the outer layer of the periosteum and the connective tissue of the intermaxillary suture and the alveolar process. The frenum, like any other structure of the human body, has a range of normality in that it varies in bulk from a heavy mass to a thin fold of tissue, and in attachment height from near the alveolar crest to high above it. Pictorially, this is illustrated in Fig. 2 which shows plaster casts of patients presenting before treatment with absence of the midline diastema. The casts are arranged in ascending order of frenum attachment height from upper left to upper right, and continuing on from lower left to lower right. These frena vary not only in attachment height, but also in tissue bulk. Attachment height was measured with fine-pointed steel dividers in the sagittal plane, from the gingival crest between the maxillary permanent central incisors, to a point directly superior to where the most inferior portion of the frenum attaches to, and blends with, the labial tissue. Frenum width was measured with dividers in the transverse plane at a point just above attachment height where the frenum reaches a uniform width. The variations in attachment height and frenum width are confirmed by the measurements listed in Table I. On the left side of Table I are measurements of patients presenting before treatment without the midline diastema. The attachment heights vary from 3.5 mm. to 9.5 mm., and the widths vary from 1.0 mm. to 2.0 mm.

TABLE I. SUPERIOR LABIAL FRENUM, MEASUREMENTS FROM PLASTER MODELS

	NO DIASTEMA			DIASTEMA PRESENT			
	ATTACH. HT., MM.	FRENUM WIDTH, MM.	AGE YR.	ATTACH. HT., MM.	FRENUM WIDTH, MM.	DIASTEMA WIDTH, MM.	AGE YR.
	4.5	2.0	9	6.5	1.5	1.5	9
	6.5	1.5	12	5.5	2.0	1.5	9
	5.0	1.5	10	8.0	1.0	1.0	17
	4.0	2.0	12	6.5	2.0	1.5	16
	6.5	2.0	14	8.0	2.0	3.0	9
	7.0	1.5	14	5.0	2.0	1.0	14
	5.0	1.5	13	3.0	1.5	1.5	7
	8.5	2.0	13	6.0	1.5	1.0	13
	6.0	1.5	11	5.0	2.5	1.5	19
	7.0	1.0	13	5.5	1.5	1.5	10
	6.0	1.5	15	4.0	2.0	2.5	15
	7.0	1.0	12	4.5	1.0	2.5	8
	5.0	1.5	15	4.5	1.5	1.0	11
	7.0	1.5	12	3.0	1.0	1.0	9
	9.0	2.0	12	5.0	2.0	2.5	9
	9.5	2.0	6	5.0	1.5	1.5	10
	3.5	1.5	10	4.0	1.5	2.0	9
Average	6.3	1.6		5.2	1.7	1.7	
Range	3.5-9.5	1.0-2.0		3.0-8.0	1.0-2.5	1.0-3.0	

THE ABNORMAL SUPERIOR LABIAL FRENUM

It seems apparent as one studies the literature on the subject that some frena have been described as abnormal simply because they were hypertrophied, while other frena have been classified as abnormal because of the presence of a

midline diastema. Many observers have noted clinically that the hypertrophied frenum of childhood usually diminishes in size with increase in age, and with the successive eruption of the permanent teeth; and most will agree that the frenum need not be termed abnormal simply because of the incidental presence of space for which it may not be responsible. Dewel[18] expresses the view that the enlarged frenum is almost invariably simply an associated structure which exists because of other conditions. He differentiates between the true abnormal frenum as one which tends to increase in size with age, and the simple enlargement as one which ordinarily becomes less evident with age.

Anatomically, the abnormal superior labial frenum might be described as one which has never developed beyond the tectolabial frenum stage of early fetal life (Fig. 1, *A*). In such cases, a continuous band of tissue would be present, extending from the inner aspect of the upper lip, down along the alveolar process, and across the crest to be inserted in the region of the palatine papilla. This condition, normal in the fetus, would be abnormal postnatally and during the eruption stage of the teeth. Shirazy[40] views this condition as a congenital anomaly, depicting in man the retention of a feature of an early stage of development in his evolutionary genesis. He points out that the mammals are the only animals in which the lips are separated from the alveolar arches, and that a diastema between the maxillary permanent central incisors with a frenum extending between the teeth as far posteriorly as the palatine papilla is a normal condition in the true femurs, which are accepted by some authorities as the probable ancestors of many different mammals, including man.

However, even if the tectolabial frenum stage persists postnatally, caution should be exercised by the diagnostician, because this condition may tend to disappear with increase in age, and with the eruption process of the permanent teeth. If the tectolabial stage remains beyond the completion of eruption of the permanent teeth, the question may still remain as to whether the fetal condition persists because of the presence of the diastema, or whether the spacing has been caused by the retention of the primitive form of the frenum.[41]

It should be emphasized that the frenum should not be regarded as an isolated structure, but rather that it should be viewed in the same light as the other parts of the rapidly changing body of the infant and child. There are many different variations in structure and function, and these are generally recognized in most studies having to do with the appraisal of the child. It is further recognized that many of these variations tend to disappear owing to environmental or constitutional factors, or to that aggregate of factors included in the process of maturation, which process, of course, also includes growth and development of the oral structures. The rapid rate of growth of the child becomes evident when we consider that the child doubles his weight on four different occasions before completion of eruption of the permanent dentition: first at about 6 months, then by the end of the third year, again at about 10 years, and once more at the age of 16 or 17. It is this rapid pace of growth and development that impels functional and structural deviations from normal to be corrected.[39]

The early teachers of orthodontics were keenly aware of the frenum because of its possible effect on the position of the teeth. Angle[2] was probably the first to describe the abnormal condition, and with his typical thoroughness and clinical acuity he noted that the teeth were separated not only by its passive presence, but also by its action mechanically. Dewey[19] early noted that the abnormal frenum was of congenital origin, and that the tissue in the abnormal frenum would grow down with the alveolar process instead of the process growing away from the frenum. To express this another way, we could say that the frenum retained its primitive form while the alveolar process proceeded on its normal path of growth and development. Strang[44] described the abnormal frenum as elongated at its alveolar end into a sheetlike process that extended lingually between the central incisors, cutting through the interproximal fibers of the periodontal membrane, and ending in the central papilla of the rugae. He added that by its presence it prevented the permanent incisors from approximating each other.

THE DILEMMA OF THE MIDLINE DIASTEMA AND THE SUPERIOR LABIAL FRENUM

The most probable reason for the existing confusion and bewilderment on the subject is the insistence of some to associate the midline diastema and the frenum as almost synonymous terms, rather than to look upon them as more or less separate entities. Dewel[18] points out a variable series of conditions that cast doubt on the frenum as the major cause of the space. There are enlarged frena with contacting central incisors and then there are other cases of enlarged frena with the central incisors in contact but with spaces on either side of the lateral incisors. Finally, there are cases of enlarged frena with the central incisors separated before the lateral incisors erupt, but with normal frena and contacting central incisors after the eruption of the lateral incisors. Tait[45] concludes from a clinical, roentgenological, and histological study that the frenum is the effect and not the cause of the diastema.

The independent character of the frenum and the midline diastema, and their lack of correlation, is shown in Table I. On the right-hand side are measurements made on plaster casts of patients presenting before treatment with a midline diastema. The space varies from 1.0 mm. to 3.0 mm. in these cases, and there appears to be little or no relationship between the width of the diastema and the width and attachment height of the frenum, which varies from 1.0 mm. to 2.5 mm. Neither is there much if any relationship between these measurements and those on the left-hand side of Table I, made on plaster casts of patients without the midline diastema. Further evidence of the lack of relationship between the frenum and the space is shown pictorially in Figs. 2 and 3. These are photographs of plaster casts of patients made before treatment. Fig. 2 shows cases with little if any midline space, and Fig. 3 shows casts of patients wth a noticeable diastema. In both sets of casts there are variations in the bulk of tissue of the frenum, and, in each set, the variations in height of the attachment of the frenum range from low to high.

Much of the seemingly mystical nature of the midline diastema would disappear (as usually would the space itself) if we would continue to remind

ourselves that more often than not, the space can be attributed to a normal or developmental origin, and that it usually will close with eruption of the succeeding teeth. Fig. 4, which illustrates the development of occlusion, shows the progression from loss of the deciduous teeth, through eruption of the central incisors, and the coincidental closure of the midline dental space as the remain-

Fig. 2.

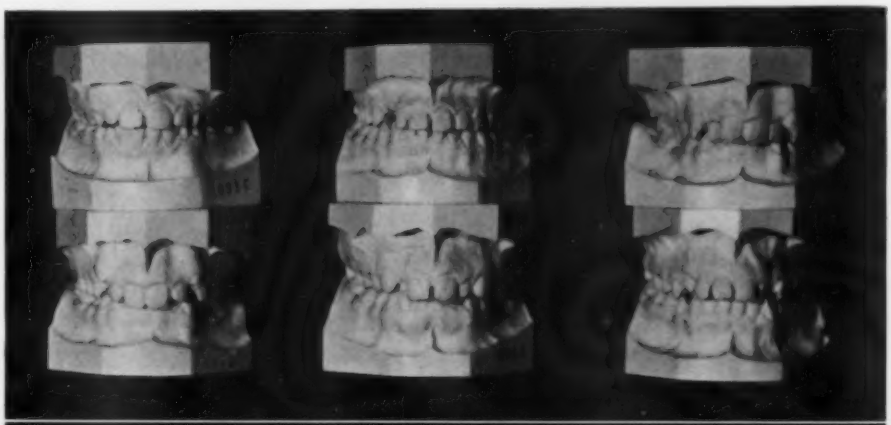

Fig. 3.

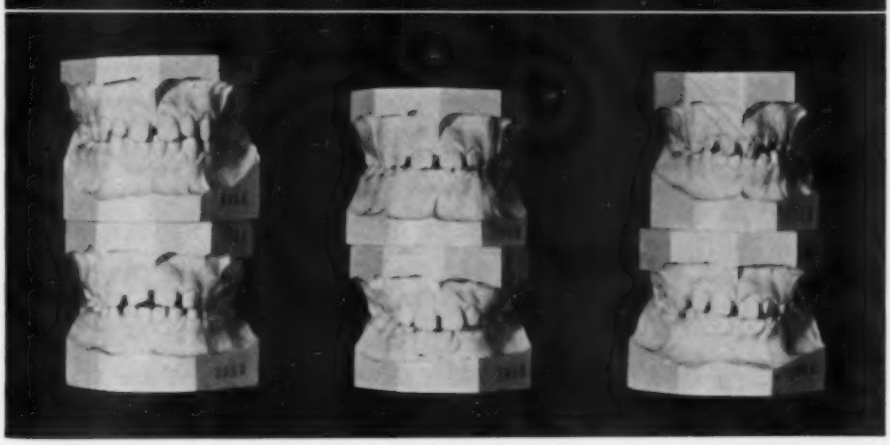

Fig. 2.—Variations in height of attachment and thickness of superior labial frenum in cases presenting before treatment with absence of midline diastema.

Fig. 3.—Variations in height of attachment and thickness of superior labial frenum in cases presenting before treatment with presence of midline diastema.

ing permanent teeth erupt. However, the number of cases treated to close this space indicates that the normal is not always recognized.[14, 48] A number of authors have noted the normalcy of the midline diastema during childhood. Broadbent[9] observed that the spaces may persist until the canines have erupted, and Massler and Schour[29] point out that after the canines have erupted, further adjustment takes place as the final molding of the arch and the alignment of the teeth are accomplished by the action of the tongue and the labial musculature (Fig. 4). Brodie[12] states that the frequency of space between the maxillary permanent incisors during the mixed dentition stage is due to the fact that

the growth of the alveolar process is a little ahead of the eruption schedule of the teeth, and that it is difficult to tell whether the frenum is the effective agent before the completion of the descent of the maxillary permanent canines. Hellman[23] urges patience if the maxillary permanent central incisors are spaced, because the process of eruption of the permanent teeth is not continuous, but

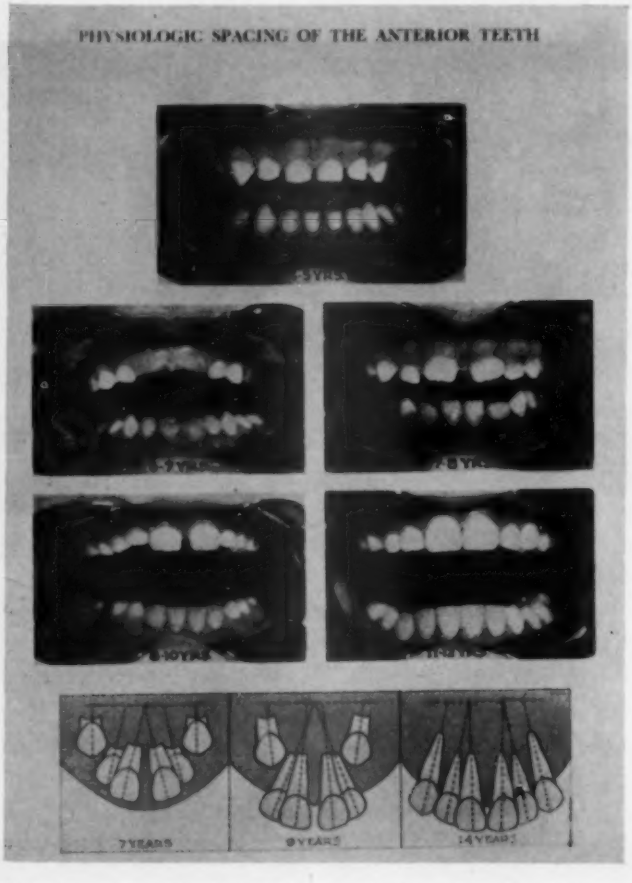

Fig. 4.—Illustration of the development of occlusion, showing the maxillary permanent central incisors erupting with a diastema, and the gradual closure of space with the eruption of the succeeding teeth. (Massler and Schour.[29])

is divided by an interval of rest into two active periods. The first period is concerned with the eruption of the first molars and the incisors, and the second period with the eruption of the canines, premolars, and second molars.

Other than the normal or developmental spacings of the maxillary permanent central incisors that have been discussed, midline dental space may be due to many other factors. Baume[4] states that certain spaces in the deciduous denture are congenital. This may be a factor in some of the midline diastema cases. Bedell[6] lists many causes of the midline dental space. Among these are missing or undersized lateral incisors or their delayed eruption, protrusion of the premaxilla, supernumerary teeth, ankylosed central incisors, flared or rotated maxillary permanent central incisors, anodontia, macroglossia, excess

tooth material in the mandibular arch, ligamentous synarthrosis in the cleft between the two halves of the maxilla, the particular position of the incisal foramen and its relation to the premaxillary suture, enlargement of the maxillary suture, and periodontitis.

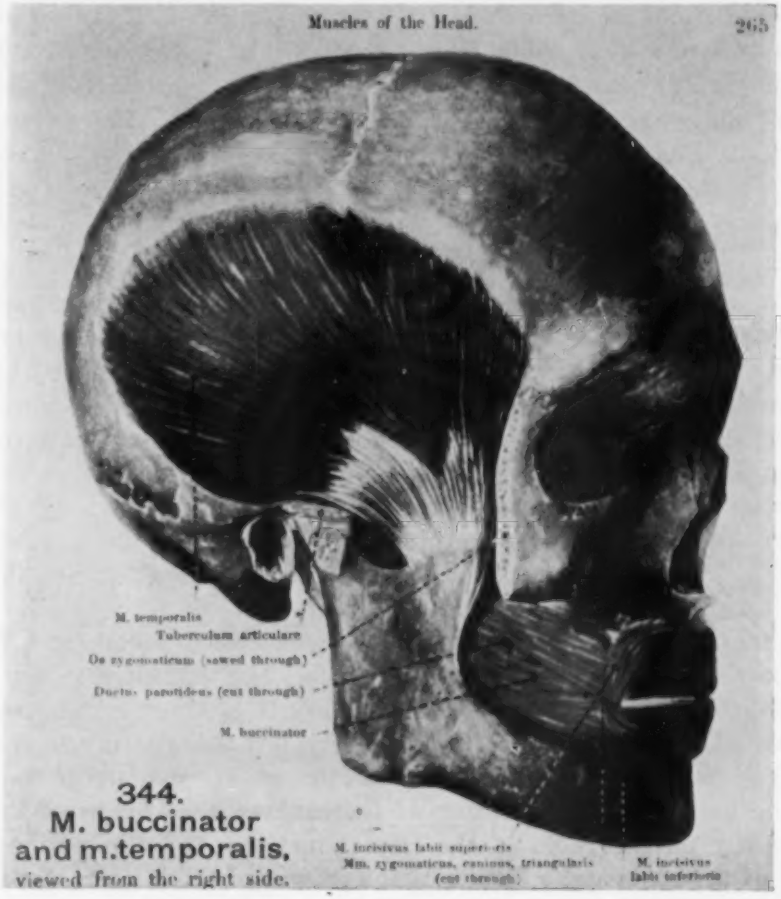

Fig. 5.—Skull of child showing the maxillary permanent central incisors in their bony crypts, separated by the intermaxillary suture. (Noyes.[32])

THE EFFECT OF GROWTH AND DEVELOPMENT OF THE ORAL STRUCTURES ON THE SUPERIOR LABIAL FRENUM AND THE MIDLINE DIASTEMA

The influence of growth processes on the superior labial frenum begins during embryonic development when the bulging alveolar process causes the tectolabial frenum to be divided into two parts, the palatine papilla and the superior labial frenum (Fig. 1), and continues through fetal and postnatal life, causing the frenum attachment to be positioned at an increasingly greater height from the gingival crest as the alveolar process continues to increase in size.[7, 28] In some cases, the series of events just described do not occur, but, instead, the tectolabial frenum stage persists. However, even if this band of tissue remains unsevered until the age of 7 years or later, the cord usually

diminishes in size with increase in age and with eruption of the lateral incisors and canines, and then tends to disappear as the central incisors become approximated.[16, 38] (Fig. 4.)

Before describing the forces that are effective agents in closing the midline diastema, it would be well to review some of the reasons for the presence of the space. Among other causes are: myodysfunction of the labial tissues, imbalance of forces of the tongue as compared with the restraining forces of the lips and cheeks, pressure habits of all kinds that are applied to the lingual surfaces of the maxillary central incisors, and malrelation of tooth and jaw size and tooth and jaw position.[6, 18] Other than these causes of the midline diastema, it is commonly observed that the maxillary permanent central incisors often erupt with space between them. Such space is usually referred to as normal or developmental spacing.

Normal or developmental spacing of the maxillary permanent central incisors may originate at the time the teeth are still in their bony crypts. As illustrated in Fig, 5, the crypts of these teeth are often separated by the intermaxillary suture. Under such conditions, the bony separation may well act as a barrier, not only preventing the teeth in their crypts from approximating each other, but also causing the teeth to start downward with a space between them when the process of eruption is initiated. Another factor that affects the position of the teeth is that the perimeter of the portion of the alveolar process that they occupy when they are in their bony crypts is smaller than that which they will fill when they are fully erupted. Thus, the teeth may be so bunched while in their crypts that the apical portions crowd together, causing the coronal portions to flare outward. This places the teeth in position to erupt along a diverging path, and, as they erupt, they become more and more spaced. (Fig. 4, age, 7 years.) Also illustrated by Fig. 4 is the way in which the eruption path of the maxillary permanent canines affects spacing of the incisors. During the early stage of eruption of the canines, the crowns of these teeth press mesially on the roots of the lateral incisors, and this action causes a bunching of the roots and a flaring of the crowns of the incisors, thus creating or increasing space between these teeth. One other type of spacing of the maxillary central incisors that may be considered as normal or developmental is that spacing which may result from an increase in size of the anterior portion of the alveolar process during the eruption stage of the incisors. Baume[5] observed in a serial study of plaster casts that expansion of the dental arches in the anterior region to accommodate the larger successional incisors was brought about by a lateral and frontal alveolar growth during the eruption period of the incisors.

The following discussion of the effect of growth and development on closure of the midline diastema will be directed toward those cases in which the space is of normal or developmental origin. Closure of such space may occur in a number of ways, and one of these is that resulting from eruption, migration, and physiological readjustment of the teeth. Strang,[44] discussing Broadbent's studies, remarks that unlike the usual description of tooth erup-

tion by apposition at the root end that is believed to force the crowns toward the plane of the arch, studies on living children clearly disclosed that a tooth at various times may progress in three distinctly different ways: first, the

Fig. 6.—Illustration showing how the buccinator and orbicularis oris muscles form a mask of tissue that completely surrounds the dental arches. (Spalteholz.[43])

growing tooth may remain stationary while its forming end grows away from the incisal surface of the bone; second, it may migrate relatively rapidly through the bone with little increase in its length; and, third, the increase in tooth length and the migration through the bone may occur simultaneously. A similar process of eruption and migration may, in part, account for some of the space closure of maxillary permanent incisors observed during this stage of eruption.

After the central incisors have erupted, there may still be some tendency for them to migrate mesially but, from this point on, space closure is more probably attributed to the action of other factors. With the eruption of the lateral incisors, and then the canines, the central incisors often move closer together, and in many cases come into contact. Part of this action is no doubt due to the release of medial pressure of the crowns of the canines on the roots of the lateral incisors, and to the further wedging action of the canines as they approach their position in the arch. (Fig. 4.) However, there appears to be

something more than the influence of the canines on space closure of the incisors. Whether this other factor is one initiated by the eruption process itself, which may set off some sort of chain reaction that influences most of the bone cells in the alveolar process so as to cause a physiological readjustment of the teeth, is not known, but we do know clinically that during each period of eruption of pairs of teeth, there is a tendency for most of the teeth to move to some extent. Baume[4] describes a similar process as a forward pressure. He states that it is a consistent observation that the mandibular permanent molars move mesially whenever a space is created anteriorly, and that this indicates that a pressure in a mesial direction persists as long as the process of eruption of the accessional teeth goes on. He adds that serial measurements in the maxilla revealed that an identical forward pressure also results in the closing of spaces whenever they existed.

An important force that effects closure of the midline space is that of the musculature of the cheeks and lips, described by both Brodie[13] and Downs.[20] Fig. 6 illustrates how much this musculature resembles a mask of tissue completely enclosing the denture. The mask of muscle is comprised of two groups: those which radiate from the orbicularis oris, and those of the buccinator. The latter muscle, after crossing the arch distal to the last mo'ar, is continued in a posterior direction, medial to the alveolar arch by means of the pterygomandibular raphe and the superior constrictor of the pharynx, to a cranial attachment on the basilar part of the occipital bone, just forward of the foramen magnum. This fixed bony attachment enhances the constricting force of the muscle mask on the denture, and thus increases the possibilities of dental space closure.

Brodie[13] relates that the muscles of the tongue, being voluntary muscles, are always under a degree of tension, and that this outward force influences the positioning of the teeth and the alveolar process so that they tend to conform to the periphery of the organ. The buccinator, stretched around the outside, contributes inward pressures and equilibrium results. The position assumed by the teeth represents the point at which equilibrium is established. But, he adds, equilibrium does not imply normality, so that if the tongue is relatively too large at birth and during infancy, as it is frequently, the equilibrium established will result in a spacing of the teeth. Spaces due to this cause tend to disappear as age advances, because the growth gradient of the tongue diminishes more rapidly than that of the facial skeleton.

The buccinator, which loses its bony attachment on the buccal or lateral aspects of the bones in the molar region, runs free from there forward and medially to join its fellow of the opposite side. The most superior and inferior fibers of this muscle continue around through their respective lips, but those at the level of the lip line decussate, the lower traveling to the upper, and the upper to the lower lip. The lip line may vary from the level of the incisal edges of the maxillary teeth to well above their gingival margins, and thus it becomes apparent that it is the lower lip that controls the maxillary teeth.[20] It is a common observation that during infancy and childhood, many patients lack tonicity of the labial musculature, and, probably aggravated by

the presence of adenoid tissue, have a characteristic appearance of mouth agape and drooping lower lip. It is further noted that many of these patients, and girls in particular, growing into the beauty-conscious teenage group, and probably benefited by atrophy or removal of adenoid tissue, have gained labial tonicity, and usually have their lips together when at rest. This change increases tension of the muscle mask, and facilitates closure of the midline dental space.

The anterior component of the force of occlusion as described by Brodie[10] and more fully by Downs[20] is another force involved in the closure of spaces in the dental arch. These authors observe that arch length is maintained by normal proximal contact relationship of the teeth. In all but those few cases characterized by generalized spacing of the teeth, any disturbance of the contact points liberates two opposite major forces, the distal pressure of the musculature and the mesial pressure of the anterior component of the force of occlusion. This anterior component is a powerful, forward driving force,

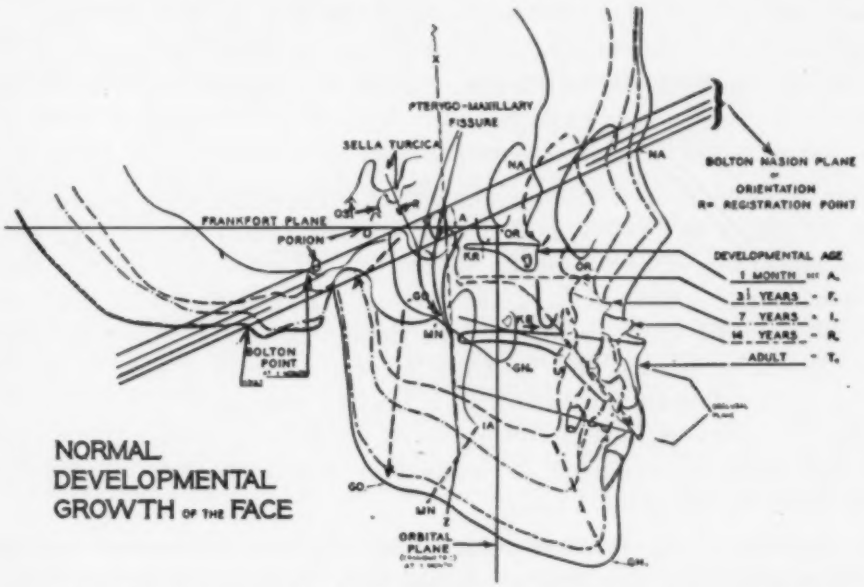

Fig. 7.—Chart of normal dentofacial growth showing how the denture increases in size in a downward and forward direction. (Broadbent.[9])

produced by a combination of factors, the most important of which becomes effective with the eruption and occlusion of the first permanent molars. Because of their anatomical form, these teeth do not dissipate stresses along their long axes. Their occlusal surface is not at right angles to the tooth axis; therefore a vector of force is formed which is in a forward direction. This is assisted by the muscular force of the buccinator as it crosses the denture in the molar region, and by the forward push of the masseter in contraction. This powerful anterior component of force from the molars is transmitted through the contact points to the teeth mesial to them, even beyond the median line.

The final series of forces that effect closure of dental space are those involved with increase in size of the mandible and the maxilla. Broadbent,[9] Brodie,[11] and Moore[31] have described the processes which result in a forward and downward growth of the face. In the mandible, the growth site responsible for this increase in size is located at the head of the condyle. In the maxilla, the growth of the face in a forward direction is due to the backward growth of the tuberosity of the maxilla against a relatively fixed base, the pterygoid process of the sphenoid bone. Fig. 7 dramatically depicts how the jaws increase in size with age. Note the extent to which the anteroposterior dimension of the jaws has increased from the age of 7 years to adulthood. As the jaws lengthen in an anteroposterior direction, the teeth are carried along with the alveolar process to a position further removed from the cranial base attachment of the superior constrictor of the pharynx, and this places an increased tension on the muscle mask, unless the muscle fibers themselves increase in length proportional to the forward growth of the jaws. Thus, with greater muscle pressure on the outside of the dental arch, a continuous closing force is exerted on any remaining spaces, especially in the anterior portion of the mouth, and this force will continue as long as growth processes of the jaws are active, and as long as tonicity of the facial muscles endures.

FRENECTOMY

The superior labial frenum received attention at an early period in orthodontic literature by Angle[2] and others who described the midline diastema as a common form of malocclusion, and listed the cause as being the abnormal development and attachment of the frenum. It followed that correction of such cases would require removal of the tissue which was considered the cause of the separation, so we find in Angle's early writings a description for the removal of the frenum. Since then, a host of authors[16, 17, 25, 36, 37, 44, 47] have described frenectomy, either by means of surgery or cautery, but these descriptions, although differing in method or technique, are in principle the same as that described by Angle.

If orthodontic or surgical interference is being planned to correct the midline dental space, the patient should first be observed over a sufficiently long period of time to permit the practitioner to observe whether favorable changes are taking place. In general, the correction should not be started until the maxillary permanent canines have fully erupted. Some writers have advised frenectomy before this stage. Lay[27] advised the operation at 6 to 8 years of age, Engstrom[21] reported a case done at 7½ years of age, and Vaughan[47] advised frenectomy at 8 to 10 years of age. Most writers agree, however, that the operation should not be considered until the canines have erupted. Actually, it probably would be better to wait upon full eruption of the upper permanent second molars, in order more fully to utilize the effects of growth and development upon closure of the midline dental space.

If sufficient time has been allowed to permit natural and developmental forces to exert their full influence upon closure of the midline dental space,

and if all other possible causes of separation have been eliminated and the space still persists, the frenum may be considered one of those rare occurrences, a truly abnormal structure, retaining all of the characteristics of the tectolabial frenum of fetal life. As such, the continuous band of tissue extending from the upper lip across the alveolar process to the palatine papilla conceivably could maintain a separation of the maxillary central incisors, because of its presence and pressure of movement. The presence and movement of this tissue are demonstrated clinically by grasping the upper lip and distending it upward and outward, and then moving it from side to side. This will cause blanching and movement of the tissue between the central incisors, posteriorly to the palatine papilla.

Since resection cases of truly abnormal frena almost always require orthodontic assistance to close the dental space, it seems logical that the procedure of choice should be one which would first involve orthodontic correction of the case. Oftentimes, the pressure atrophy supplied by the orthodontic appliance is all that is needed. After the teeth have been approximated, the closing pressure is removed and the case is observed to determine whether the teeth will remain together. If the midline space recurs, frenectomy may be considered. If a resection is done, a minimum of tissue should be removed, and the teeth should be moved together immediately.

Indicative of the caution that should be exercised by practitioners before deciding upon a frenectomy is the fact that all through the years some of the men in the specialty have done only a few, or no frenectomies at all. Johnson[26] and Taylor[46] concur that there is little need for the operation, neither having encountered an abnormal frenum in their long years of practice. Mershon,[30] in forty-four years of dentistry and over three thousand cases treated orthodontically, had never encountered space between the maxillary permanent central incisors that he had any difficulty in closing and keeping closed, with the exception of those types of cases in which there was generalized spacing of all of the anterior teeth. Howard[24] had but one operation in twenty years, and Brodie[12] had seen only one operable case in eighteen years.

PRESENT STATUS OF FRENECTOMY OF THE SUPERIOR LABIAL FRENUM AS DEPICTED IN SURVEYS MADE OF ORTHODONTISTS AND ORAL SURGEONS

To obtain data regarding the current clinical status of frenectomy of the superior labial frenum, nationwide surveys were made on a sample basis of selected orthodontists and oral surgeons. The choice of practitioners was made geographically so as to obtain results representative of the various sections of the country. Since one of the questions involved the long-term trend of frenectomy, the questionnaire was directed to men of long experience. The list of orthodontists was obtained from the *Orthodontic Directory of the World,* fifteenth edition, 1950; and that of the oral surgeons from the booklet, *Diplomates of the American Board of Oral Surgery,* 1950.

A. *Results of the Survey Made of Orthodontists.*—Table II is a composite table of seventeen respondents to the survey directed toward orthodontists.

Item 1 of this survey asked for the number of frenectomies done in 1950 without orthodontic aid, and the number of these cases in which the diastema closed. Two offices reported such cases. One of these listed ten cases resected, and six of these cases in which the diastema had closed. The second listed two cases operated, and closure of the diastema effected in both cases.

In item 2 was recorded the number of cases done in 1950 with orthodontic assistance rendered before frenectomy, and the number of these cases in which the teeth remained together. Three offices tabulated such cases. One office had one case, and noted that the teeth remained together in this case. A second office did five cases, and in four of these the teeth remained together. The third office reported two or three cases, with the teeth remaining together in all.

Item 3 called for the number of cases done in 1950 with orthodontic assistance rendered after frenectomy, and the number of these cases in which the teeth remained together. Eight men responded. Five each listed one case treated, and, of these, four stated that the teeth remained together; the fifth reported that the case was still in retention. A sixth noted four cases, with the teeth remaining together in all four. A seventh listed five cases, and recorded that the teeth remained together in all of these. An eighth did thirty cases, and in all of these the teeth remained together.

TABLE II. COMPOSITE TABLE OF ANSWERS FROM SURVEYS OF ORTHODONTISTS

1. Number of frenectomies done in 1950 without orthodontic aid	12
In how many of these cases did the diastema close?	8
2. Number of cases done in 1950 with orthodontic assistance rendered before frenectomy	8
In how many of these cases did the teeth remain together?	7
3. Number of cases done in 1950 with orthodontic assistance rendered after frenectomy	44
In how many of these cases did the teeth remain together?	43
4. In general, are you doing or recommending more or fewer frenectomies than five years ago?	*;
than ten years ago?	*;
than twenty years ago?	*
5. Number of cases done in 1950 in which space between the maxillary permanent central incisors was closed orthodontically without frenectomy	103*
In how many of these cases did the teeth remain together?	94

*See text for explanation.

Note: The data included in this table are total number of cases reported by seventeen respondents.

Item 4 asked, in general whether the orthodontist was doing or recommending more or fewer frenectomies than five, ten, and twenty years ago. Some of these answers were given in the form of remarks, and therefore could not be tabulated. Of those that could be summarized, three are doing fewer, and six are doing the same number of frenectomies as compared to five years ago. Four are doing fewer than, and six the same as ten years ago. One office is doing more than, seven are doing fewer than, and three are doing the same as twenty years ago.

The answers to item 5 were used to compile the number of cases treated in 1950 in which space between the maxillary permanent central incisors was closed orthodontically without frenectomy, and whether the teeth remained together in these treated cases. Eleven offices reported 103 such cases, and recorded that the teeth had remained together in ninety-four of these. One office listed two cases, with both still in retention. A second reported two or three cases treated, and the space remained closed in all. A third did ten cases, with the teeth remaining together in eight of these. A fourth noted ten cases, and said that the teeth remained together in all ten. A fifth treated twelve cases, with the space remaining closed in eleven. A seventh treated fifteen cases, and the teeth remained together in thirteen. An eighth listed twenty cases, and the space remained closed in all. A ninth did twenty cases, and the teeth remained together in all. A tenth stated that "all cases with midline space" were treated, and that the teeth remained together in "almost all." An eleventh remarked that "many" cases were treated, and that the teeth remained together in "all."

Some of the respondents appended a remark to the survey questionnaire, and it would be interesting to list some of these. At one extreme, one office reports that the policy is surgically to remove the frenum in all cases after the central incisors have fully erupted, and the frenum extends to, or beyond, the crest of the alveolus. At the other extreme, another office notes that in twenty-six years of practice, a frenectomy has never been recommended. Other remarks reflecting the wide range of individual opinion were noted as: "Most of my cases are operated in the mixed-dentition stage"; "not over twelve cases in twenty years"; "not over five in twenty years"; "only two cases in twenty-five years"; and "about twenty cases in twenty-two years." One orthodontist, cognizant of this divergence of opinion, may have been paraphrasing the thoughts of many other men when he appended this remark: "After thirty-five years of the special practice of orthodontics, I find the subject at times still quite a dilemma."

TABLE III. COMPOSITE TABLE OF ANSWERS FROM SURVEY OF ORAL SURGEONS

1. Number of frenectomies done in 1950	208
a. How many of these cases were referred by an orthodontist?	121
b. How many of these cases were age 11 years or older?	73;
age 7 to 11 years?	128; younger than age 7 years? 7
2. In general are you doing more or fewer frenectomies than five years ago?	*; than ten years ago? *; than twenty years ago? *

*See text for explanation.

Note: The data included in this table are total number of cases reported by seventeen respondents.

B. *Results of Survey of Oral Surgeons.*—Table III is a composite of answers from seventeen respondents to the survey made of oral surgeons. In answer to item 1, which asked for the number of frenectomies performed in 1950, seventeen offices reported 208 cases. From office to office, these varied from none to thirty-five. In answer to item 1a, these offices stated that 121 of the 208 cases operated were referred by orthodontists. These referrals

varied from none to all of the frenectomies done by the various oral surgeons. Answers to item 1b showed that of the 208 frenectomies, 73 were 11 years or older, 128 were 7 to 11 years old, and 7 were younger than the age of 7.

Item 2 asked in general whether the oral surgeon was doing more or fewer frenectomies than five, ten, and twenty years ago. Some respondents did not answer this question. For those who did report, the status is as follows: seven are doing fewer than, four are doing more than, and two are doing the same as compared to five years ago; eight are doing fewer than, four are doing more than, and one is doing the same as ten years ago; and six are doing fewer than, four are doing more than, and one is doing the same as twenty years ago.

C. *Discussion of Results of the Surveys.*—With the exception of two offices, the respondents to the survey of orthodontists are recommending fewer frenectomies. Only two of the offices reported frenectomies without orthodontic aid. Of the fifty-two cases listed in items 2 and 3 of the questionnaire (cases in which frenectomy was performed along with orthodontic assistance), a total of forty was reported from two offices alone, and only four from the remaining offices. In contrast to this, 103 cases with midline diastema were listed as corrected orthodontically without frenectomy. Actually, this total should be even greater, since two of the respondents answered this item not with the number of cases, but rather with remarks. One noted "many," and the other stated, "All cases with midline space." Thus it is obvious that many orthodontists routinely close the midline space with appliances, and without resorting to frenectomy. It is also worthy of note that a high percentage of the midline diastema cases that were treated orthodontically were successful in that the teeth remained together after treatment.

Table III shows that approximately 60 per cent of the cases of frenectomy reported by the oral surgeons had been referred by orthodontists. It may be assumed that the bulk of the remaining cases were referred by the general dentist, the pedodontist, and the pediatrician. Even though only seven of the 208 cases of frenectomy were younger than 7 years, it seems improbable that the operation was indicated at so early an age. The majority of frenectomies (128 out of a total of 208) were done at the age of 7 to 11 years. It seems apparent that many cases are still being operated at a time before the processes of growth and development have had an opportunity to exert a maximum favorable influence on the midline diastema and the frenum. It is, however, consoling to note that the answers to item 2 indicate that, in general, oral surgeons are doing fewer frenectomies than five, ten, and twenty years ago.

It would be worth while to note the remarks appended to the questionnaire by various respondents to the survey of oral surgeons. One states that he has operated on few cases, because he believes that orthodontic treatment in itself usually causes atrophy of the frenum. Another says that the reason that he does not do a frenectomy unless ordered by the orthodontist is that the oral surgeon's experiences in the past were uniformly bad; that removal of the

frenum did not cause the teeth to move together. A third remarks that he has refrained from surgery of the frenum for some years, because it was his impression that surgery created additional scar tissue which made orthodontic management more difficult; that the frenum was wide because of the separation of the teeth, and that when the teeth were properly arranged in normal contact, the frenum disappeared.

In general, the surveys indicate that the opinion of most of the oral surgeons coincides closely with that of the majority of the respondent orthodontists.

SUMMARY

1. The superior labial frenum is a normal structure of the oral cavity, and, being such, it can be expected to vary in size and bulk within a normal range, as do other structures of the human body. The normal frenum has been described embryonically, histologically, and anatomically.

2. The abnormal superior labial frenum has been described anatomically. The abnormal frenum may be expected to occur only at very infrequent intervals; thus care should be exercised by the diagnostician, so as not to classify the normal as abnormal, or to assume that the frenum is abnormal simply because it may be enlarged or hypertrophied, or to assume that the frenum is abnormal simply because of the incidental presence of a midline diastema of the teeth.

3. The superior labial frenum and the midline diastema should be considered as more or less separate entities. The tendency of some to think of these in almost synonymous terms makes for confusion. Measurements made on plaster models of patients presenting before treatment show little or no correlation between the frenum and the dental space.

4. The midline diastema of the teeth is often a normal or developmental occurrence, due to the position of the teeth in their bony crypts, to the eruption path of the cuspids, and to the increase in size of the premaxilla at the time of eruption of the maxillary permanent central incisors.

5. Eruption, migration, and physiological readjustment of the teeth, labial and facial musculature, development into the beauty-conscious teenage group, the anterior component of the force of occlusion, and the increase in the size of the jaws with accompanying increase in tonicity of the facial musculature all tend to influence closure of the midline dental space. Since the frenum is con sidered a problem only if the teeth are separated, the effect of these natural forces is not only to close the midline dental space, but also automatically to eliminate the problem of the frenum.

6. Relatively early in orthodontic literature, the superior labial frenum was listed as a cause of the midline diastema. Frenectomy was advised, and techniques for its removal were described. In order to determine the present clinical status of frenectomies, a survey was made of orthodontists and oral surgeons. The number of frenectomies currently recommended by orthodontists is relatively small. Most of the respondents are treating the midline dental

space orthodontically without frenectomy. The oral surgeon respondents indicate that the majority of frenectomies that they do are referred to them by orthodontists, but that the number of cases operated on now are fewer than five, ten, and twenty years ago.

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Reports

REPORT OF THE LIBRARIAN, AMERICAN ASSOCIATION OF ORTHODONTISTS, 1952

I WISH to report that the Library of the American Association of Orthodontists, which is kept in a locked cabinet in the library of the American Dental Association, contains the following material:

Bound copies of the proceedings of the A.A.O. meetings for the years 1905 to 1946, with the exception of the years 1906, 1917, and 1918.

Secretary George R. Moore wrote me as follows: "Proceedings were actually published in 1906 and 1917, but I cannot find any indication that Proceedings of the 1918 meeting were published."

The 1906 meeting was held in New York City, December 27 to 29, Dr. Rodrigues Ottolengui, President.

The 1917 meeting was held in Excelsior Springs, Mo., September 5 to 8, Dr. M. N. Federspiel, President.

The 1918 meeting was held in Chicago, Ill., August 1 to 3, Dr. D. Willard Flint, President.

The Old Hickory Bookshop of 31 East 10th St., New York 3, N. Y., is now offering for sale the library of Dr. B. W. Weinberger. Item No. 22 on page 2 of their catalogue reads as follows:

> American Society of Orthodontists. A collection of the Annual Meeting Announcements, held in various parts of the country, from 1902 through 1951. This includes the following Annual Meetings: 2nd, 3rd, 5th, 6th, 8th-10th, 12th-14th, 16th-25th, 26th-38th, 40th-47th. In all, 40 Announcements, 12 mo to 8 vo in size, original wrappers, bound in 2 volumes, crude cloth binding, V.p., 1902-1951. $25.00.
>
> *** Despite the apparent hiati, this is a complete file since the first meeting was never printed, and many meetings, (the 4th, 11th, etc.) were not held separately. There probably is no other complete file in existence.

I suggest that this item of two volumes be purchased and placed in our library.

Recently, Secretary Moore sent me copies of the AMERICAN JOURNAL OF ORTHODONTICS, covering the period of August, 1948, to December, 1951, inclusive. Also several bound copies of the transactions of the 1942 A.A.O. meeting, printed in Spanish. I sent these journals and six volumes of the Spanish translation of the 1942 meeting to the A.D.A. library. I suggest that one copy of the volume in Spanish be filed as part of our library and that the others be placed in the A.D.A. library, with the privilege of distribution to dental or medical libraries, particularly to those located in Spanish-speaking areas.

The A.D.A. library contains a number of duplicate copies of proceedings of A.A.O. meetings. These are loaned to members and some are given to dental and medical libraries when requested.

Dr. Donald Washburn, A.D.A. Librarian, informed me that his library receives regularly several copies of the AMERICAN JOURNAL OF ORTHODONTICS, but that he could use two more copies as there are numerous requests for orthodontic literature.

I recommend that our organization subscribe for three copies of the JOURNAL to be sent to the A.D.A. library. One set should be bound annually and placed in our archives, the other two sets to be the property of the A.D.A. The A.A.O. should pay the cost of binding of the volume we are to keep.

Secretary Moore recently wrote me that the librarian at the University of Michigan Dental School was at work microfilming the minutes of the A.A.O. meetings. When this project is completed, I suggest that the microfilms be stored in a fireproof container. It would seem logical to have these microfilms kept at the A.D.A. library if they have suitable facilities available for the purpose.

Beginning with the year 1947, the proceedings of the A.A.O. meetings have been included in the AMERICAN JOURNAL OF ORTHODONTICS and have not been published separately. I will try to secure copies of the issues of our JOURNAL from January, 1947, to July, 1948, inclusive, so that the A.D.A. library may have them bound together with those journals recently delivered. This will provide bound volumes for the years 1947 to 1951 inclusive.

I believe that it is not desirable or advisable for us to attempt to establish and maintain a general orthodontic library inasmuch as there are many dental libraries available in all sections of our country where our members may borrow or have access to dental literature.

If the suggestions offered in this report are acted upon favorably, I would recommend that the office of librarian be discontinued. The Secretary should be directed to send three copies of our JOURNAL to the A.D.A. library, one copy to be bound and placed in our archives. Also, he could send microfilms of the A.A.O. minutes to the library for safekeeping.

On behalf of the American Association of Orthodontists I wish to express our genuine appreciation for the courtesies and cooperation of Dr. Donald Washburn, Librarian of the American Dental Association.

Respectfully submitted,
CHARLES R. BAKER, Librarian.

In Memoriam

HERBERT C. HABERLE
1911-1952

HERBERT C. HABERLE, aged 41, suffered a heart attack and died suddenly Sept. 2, 1952. He was a graduate of Northwestern University College of Dentistry and the Graduate Orthodontic Department. Dr. Haberle practiced at Hinsdale, Ill., and maintained a branch office in Glen Ellen. He was the brother of the late Dr. Fredrick E. Haberle. His widow Mary, two sons, and a daughter survive him. We share their loneliness.

PAUL G. LUDWICK
1897-1952

PAUL G. LUDWICK, of Lincoln, Neb., died Thursday, July 31, 1952, at the age of 55. He was born Sept. 21, 1897, at Greensville, Ohio, coming to Nebraska with his parents in 1902. He graduated from the College of Dentistry, University of Nebraska, in 1919 and immediately located in Lincoln. In 1926 Dr. Ludwick attended the International School of Orthodontia at Kansas City, limited his practice to orthodontics from that date, being one of the pioneers of orthodontics in Nebraska.

Dr. Ludwick was a past president of the Nebraska State Dental Association, a member of the American Association of Orthodontists, and a diplomate of the American Board of Orthodontics. He was also president of the Central Section of the American Association of Orthodontists.

His outside interests were many and varied. He was a member of the Westminister Presbyterian Church, a Mason affiliated with Lincoln Lodge No. 54 A.F. and A.M., a member of Delta Sigma Delta dental fraternity and Sigma Alpha Epsilon social fraternity. He served as president of the University Club of Lincoln in 1937, and was continuously active in the Community Chest of Lincoln.

He is survived by his wife and two sons, to whom we extend our deep sympathy.

CORNELIUS TERHUNE ROWLAND
1899-1952

CORNELIUS TERHUNE ROWLAND died Dec. 30, 1952, following a heart attack suffered shortly after arriving home from his office.

He was born Nov. 26, 1899, in Mercer County, N. J., son of Frederick Andrews and Ethel Terhune Rowland. His boyhood was spent in Princeton, N. J., where he attended Blair Academy.

His professional training was obtained at the University of Denver where he received the degree of Doctor of Dental Surgery in June, 1926. During this

time he was married to Vesta Wilkenson of Chambersburg, Pa., and their first son, Frederick C., was born. Following graduation, he practiced for a year in the small town of Saguache, Colo., while waiting to take the Texas Board. He received his Texas license in June, 1927. The family moved to New Braunfels, Texas, where he practiced for a short while and where their second son, Spencer A., was born. Dr. Rowland next moved to Kerrville where he associated himself with the late Dr. Wall for several years in the general practice of dentistry.

Wishing to limit his practice to the specialty of orthodontics, he went to San Francisco where he spent a year in the graduate school of the University of California. Following this, he worked a year in the office of the late Dr. Percy Williams in Tucson, Ariz. While in Tucson he was licensed to practice orthodontics in the State of Arizona in July, 1934. He returned to Kerrville for a short while before moving to San Antonio in the latter part of 1935 to limit his practice to orthodontics, maintaining a branch office in Kerrville for several years for convenience of patients in that section. In May, 1937, he formed a partnership with Dr. Dan C. Peavy which continued until August, 1942. In August, 1948, Dr. John Halet became associated with him.

He was a lifelong member of the Presbyterian church and was chairman of the Greeting Committee of the Board of Deacons of the First Presbyterian Church; he was present early each Sunday morning to greet the many visitors. His welcome smile and warm greeting made many friends for the church. Dr. Rowland was also a member of the following organizations: American Dental Association; Texas State Dental Society; San Antonio District Dental Society; American Association of Orthodontists; Southwestern Society of Orthodontists; Texas Society for the Advancement of Dentistry for Children; Tweed Foundation of Orthodontic Research; Tweed Study Group of the Southwest. He was a diplomate of the American Board of Orthodontics; a Fellow of the International College of Dentistry; a member of the Pierre Fouchard Academy; Xsi Psi Phi dental fraternity; New Jersey Society, Sons of American Revolution; Scottish Rite Bodies and Shrine.

His outstanding ability has brought him national recognition in the field of orthodontics. He was held in highest esteem by all members of his profession who bestowed many honors upon him.

He is survived by his wife Vesta Wilkenson Rowland, two sons, Frederick C. Rowland, a senior law student at the University of Texas, and Spencer A. Rowland, a junior medical student at Temple University Medical School, his father, Frederick A. Rowland of Georgetown, Ky., and three grandchildren, Marcia Katherine Rowland, Frederick C. Rowland II, and Mark Andrews Rowland.

His life was characterized by all of the high ideals to which mortal man can attain. His was a life devoted to unselfish service to his fellow man. He was modest to the point of avoiding recognition and honors. Kindness and consideration for his fellow man motivated his life and were evidenced by his willingness to share his knowledge, his time, and his substance with others. He contributed much toward a better world.

WILLIAM F. TAYLOR
1875-1952

WILLIAM F. TAYLOR, a dentist for the last fifty years, active in civic and lodge circles and an ardent follower of the circus, died unexpectedly at his home, 351 East Division St., Fond du Lac, Wis., May 15, at the age of 77.

Throughout the years, Dr. Taylor received several citations of his contributions to his profession. On March 25, 1952, he was presented with a certificate of commendation by members of the Fond du Lac County Dental Society for fifty years of practice in the community, having been one of its earliest members. He received his dental degree after studying at some of the nation's leading institutions and also did considerable postgraduate work.

Dr. Taylor entered the dental department of Marquette Medical School in 1900 and after completing two years of study there went to the University of Illinois for his third year, graduating in 1903. He then located in Fond du Lac. He did postgraduate work in denture and nerve blocking and orthodontics, specializing in the latter.

In 1915 he graduated from the Dewey School of Orthodontia. He later attended Columbia University, New York City, where he took several short courses in orthodontics, and in 1926 Dr. Taylor was one of 26 dentists in the country selected and given a course at Vanderbilt University, Nashville, Tenn.

Active in the community during his half a century, Dr. Taylor was a member of the Fond du Lac Lodge 140, F. and A.M.; Darling Chapter 20, R. A. M.; Fond du Lac Commandery of Knights Templar; charter member of Keystone Shrine 4; Fond du Lac Chapter 70, Order of the Eastern Star; Shriners, Tripoli Temple, Milwaukee, and was also a thirty-second degree Mason.

In addition to membership in local and state dental societies, he was a member of the American Dental Association and the American Association of Orthodontists. He was also certified by the American Board of Orthodontics, as well as holding an honorary membership in Omicron Kappa Upsilon fraternity at the University of Illinois.

An ardent circus fan, Dr. Taylor often journeyed to other parts of the country to witness performances of the nation's top troupes, and was a personal friend of many circus personalities.

Born Jan. 16, 1875, in Sauk City, he was the son of the late Robert and Elizabeth Miller Taylor. He had followed the machinist trade in Eau Claire, Stevens Point, Green Bay, Wis., Albuquerque aand Ratoon, N. Mex., Globe and Bisbee, Ariz.

Dr. Taylor was married to Miss Mae Vera Wheeler in Fond du Lac on Oct. 17, 1907. He is survived by his widow, Mae; two daughters, Mrs. Don L. Burns, Fond du Lac, and Mrs. Kurt G. Radtke, Austin, Texas, and four grandchildren.

Department of Orthodontic Abstracts and Reviews

Edited by

DR. J. A. SALZMANN, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City

Abstracts Presented Before the Research Section of the American Association of Orthodontists, April 23, 1951

The Uptake of Radiccalcium ^{45}Ca in the Skull and Face of the Rat*: By Joseph R. Jarabak, D.D.S., M.S.D., and Maclyn Kamins, M.D., Northwestern University Dental School, Chicago, Ill.

Radioautographs were made of sagittal sections taken through the skull of two rats. These rats were given 40 microcuries radiocalcium (^{45}Ca)/100 grams of body weight, intraperitoneally, three hours before they were sacrificed. The sagittal section taken through the root area of the upper central incisor and molar area shows extensive deposition in the formative zone of the incisor. There is also an area of deposition along the alveolus of the incisor. The uptake in the upper molar area is principally in the dentine with a very light uptake along the dentoenamel junction. There is an extensive area of calcium uptake along the upper alveolar ridge and extending upward into the maxilla. A section taken anteriorly, through the malar portion of the zygomatic arch, and posteriorly, through the tympanic bulla, shows areas of greatest uptake of calcium along the lateral superior aspect of the zygomatic arch. The inferior border of the zygomatic arch is also an area of heavy uptake. The inferior aspect of the tympanic bulla, the coronal and frontal nasal sutures, as well as the inner cranial table, shows extensive deposition of radiocalcium (^{45}Ca).

The presphenoid and basisphenoid show very small uptake in their respective bodies but considerable uptake in the region of the sphenooccipital and basispheno-presphenoidal synchondroses.

Craniofacial Proportionality in a Horizontal and Vertical Plane, A Roentgenographic Study in Normal Lateral Incisors: By Benjamin H. Williams, University of Illinois College of Dentistry, Chicago, Ill.

For the past few years there has been a growing conviction that there is no such single entity as a "normal" facial pattern. In the dentofacial complex there is a random combination of the facial parts, which may all be within a normal range in size when taken individually, but when combined they may produce a condition called dysplasia. The variation of these parts has led to several studies of the craniofacial complex, and this investigation concerns craniofacial proportionality in a horizontal and vertical plane, using lateral roentgenographic tracings.

The method utilized consists of superposing these tracings on millimeter graph paper, which has been divided into four (4) quadrants by two (2) coordinates, one horizontal and one vertical, which intersect in the middle of the page. The plane S-N was laid on the horizontal coordinate and "S" was oriented at the intersection of the two coordinates. Thus each individual

*This work is supported in part by United States Public Health Grant No. D32(C2) in the departments of anatomy and orthodontics.

anatomical point of interest could be located in both a horizontal and a vertical plane.

At present, only cases with normal occlusion have been investigated, and both longitudinal and cross-sectional samples of these have been studied.

Distinctive Features of the Temporomandibular Joint in Class III Malocclusion: By Robert M. Ricketts, D.D.S., M.S., University of Illinois College of Dentistry, Chicago, Ill.

Functional and morphological variations of normal temporomandibular joints and those found in cases of Class II malocclusions have been reported by the author previously. The objective of this study is to use that information as a base line for the comparison of Class III cases.

A recapitulation of the outstanding observations will be made to familiarize the reader with this information.

The distinguishing characteristics of the Class III temporomandibular joint are as follows:

1. Differences in morphology
   a. Height of eminence
   b. Flatness of angle of eminence
   c. Long neck of condyle
2. Differences in function
   a. Rotation of condyle
   b. Path of closure
   c. Positions of condyle

Growth Behavior of the Human Bony Profile as Revealed by Serial Cephalometric Roentgenology: By Milton J. Lande, D.D.S., University of Illinois College of Dentistry, Chicago, Ill.

The purpose of this investigation was to study the results of various growth rates on the behavior points on the facial profile.

The material consisted of serial lateral roentgenograms of 34 untreated males, with an average of 15 headplates in each series. The mean range of the observation was 4 to 17 years.

The points used to delineate the profile were nasion, anterior nasal spine, subspinale, supramentale, pogonion, gnathion, and gonion. In addition to these the following planes were recorded: sella-nasion, Bolton, and the Frankfort horizontal. Sella-nasion was employed as the basis for superpositioning and the successive tracings of each individual were registered at nasion. Both angular and linear measurements were made.

A Serial Growth Study of Newborns With Cleft Lip and Cleft Palate: By S. Pruzansky, D.D.S., M.S., Special Research Fellow, The National Institute of Dental Research, United States Public Health Service.

In January, 1949, the Cleft Palate Training Program and Cleft Palate Center were officially established at the University of Illinois, under the sponsorship of the Children's Bureau of the Federal Security Agency. The purpose of this center is to provide interested specialists in the health services with additional training in their particular field; to promote knowledge of, and consideration for, all dimensions of the cleft palate person's need, and to foster research.

As part of this program, a continuing growth study of newborn infants with cleft lip and cleft palate was instituted two years ago by the Depart-

ment of Orthodontia of the University of Illinois, with the cooperation of Loyola University. This study was designed in an effort to provide solution to the following problems:

1. What is the growth potential of the face of the child with a cleft palate? A series of normals, under investigation for the past twenty years at the University of Illinois, is available as a control group.
2. What are the effects of surgery, in terms of kind of surgery and age at surgery, on the growth of the face?

To date, cephalometric roentgenograms, dental casts, photographs, and intraoral x-rays have been obtained on more than 150 different individuals. The plan of study involves the recall of newborn infants every three months for the first year of life and twice annually until the age of 5. Thereafter, recalls are yearly.

The material collected is presented in tabulated form with reference as to the type of defect and age group. In addition, casts and tracings of cephalometric roentgenograms of selected cases are presented to illustrate the results of surgical procedures.

Effect of Surgical Removal of the Condyle on the Growing Mandible: An Experimental Study in the Macaca Rhesus Monkey: By Bernard G. Sarnat and Milton B. Engel, University of Illinois College of Dentistry, Department of Oral and Maxillofacial Surgery and Department of Orthodontia, Chicago, Ill.

The effects of resection of the condyle on mandibular growth were studied in a group of 10 Macaca rhesus monkeys (5 unoperated controls, 2 with a unilateral condylectomy and 3 with a bilateral condylectomy). The animals were operated at about 8 months. The postoperative survival period ranged from four to seventeen months. Serial cephalometric roentgenograms were taken preoperatively, immediately after surgical removal of the condyle, and at six-month intervals subsequently. Impressions were taken of the denture preoperatively and at six-month intervals subsequently. The skulls were dissected, studied grossly and roentgenographically. Examination of the serial cephalometric roentgenograms revealed diminished density of the ramus and remodeling. Serial records showed that the ramus failed to grow in height after the condyle was resected. Where the operative interference was unilateral, a marked asymmetry of the mandible and the middle third of the face developed. Beginning evidence of antegonial notching and minor changes in the contour of the body of the mandible were seen in animals with a postoperative survival beyond one year. Examination of the gross specimens confirmed the roentgenographic findings. The zygomatic arch and orbit were consistently lower on the operated side. There was a bony outgrowth, particularly on the medial of the area resected, which was covered with cartilage and resembled a condyle. This was more prominent in the animals with a longer postoperative survival. The new joint surfaces were anterior to the glenoid fossa. In no instance was there an ankylosis.

News and Notes

American Association of Orthodontists

When the American Association of Orthodontists meets in Dallas, Texas, April 26 to 30, 1953, the Baker Hotel will be the headquarters hotel. Dallas has complete facilities to make it one of America's leading convention cities—more than 130 hotels, large and small, and 90 tourist courts, with total guest capacity of around 25,000; diversified entertainment and recreation; thousands of square feet of exhibit space; and wholehearted hospitality on the part of the citizenship. Dallas' eight largest downtown hotels, including the Hotel Adolphus and the Baker Hotel (Fig. 1), have a total of more than 3,500 rooms alone. Hundreds of independent oil operators, many of them with interests in all the major Mid-Continent fields, make their headquarters in Dallas. The city is also headquarters for drilling contractors, lease and royalty brokers, and allied interests.

Outline of Essay Program

Spencer R. Atkinson, Pasadena, Calif. Early Treatment.

Ernest N. Bach, Toledo, Ohio. Incidence of Caries in Orthodontic Patients.

Dr. Henry Beyron, Stockholm, Sweden. Aging Changes in Adult Dentition and the Preservation of Supporting Tissues.

Elena Boder, M.D., Los Angeles, Calif. Facial Asymmetry in the Newborn Infant; Its Etiology and Orthodontic Significance.

Gerard J. Casey (A.D.A.), Chicago, Ill. Orthodontic Education.

S. Fastlicht, Mexico City, Mexico. Treatment of Impacted Cuspids.

T. M. Graber, Chicago, Ill. An Up-to-the-moment Review of the Clinical Adaptation of Cephalometry as a Diagnostic Aid.

L. B. Higley, Iowa City, Iowa. Rational Approaches in Orthodontic Diagnosis.

A. F. Jackson, Philadelphia, Pa. The Nature and Place of Removable Appliances in Orthodontic Treatment.

Allen H. Suggett, Santa Barbara, Calif. The Correction of a Mandibular Macrognathia by Surgical Means by Resecting the Ascending Ramii Just Below the Joints, the Operation Being Done From the Outside. A Study of Pioneer Operation Performed in 1930, and Predicated Upon Careful Gnathostatic Diagnosis and Orthodontic Preparation.

Paper prepared under direction of Robert E. Moyers, Toronto. Intraoral Factors Affecting Case Assessment.

Walter J. Pelton (U.S.P.H.S.), Washington, D. C. Orthodontics From the Public Health Viewpoint.

H. C. Pollock, St. Louis, Mo. Orthodontic Trends.

J. A. Salzmann, New York, N. Y. General Growth Acceleration and Retardation in Relation to Dentofacial Development.

Arnold E. Stoller, Seattle, Wash. The Normal Position of the Maxillary First Molar.

John R. Thompson, Chicago, Ill. Normal and Abnormal Function of the Temporomandibular Joints.

Clifford L. Whitman, Hackensack, N. J. Habits Have Gotten to Be a Habit With Me. Prize Essay. Speaker to be announced later.

Symposium. Five case reports by members using different types of appliances and technique in the treatment of a typical distoclusion case.

Appliance	*Speaker*
Edgewise	F. F. Schudy, Houston, Tex.
Universal	Don C. MacEwan, Seattle, Wash.
Labiolingual	William H. Oliver, Nashville, Tenn.
Removable	S. D. Gore, New Orleans, La.
Twin arch	Earl E. Shepard, St. Louis, Mo.

A session for the presentation of abstracts of research studies will be held during the next meeting of the American Association of Orthodontists to be held at the Baker Hotel in Dallas, Texas, on April 26 to 30, 1953.

The titles, authors' names, and applications, should be submitted to Dr. John R. Thompson, 311 East Chicago Ave., Chicago, Ill., before March 15, 1953, in order to be included in the official program.

The National Railways of Mexico General Agency, 2401 Transit Tower, San Antonio 5, Texas, has arranged an all-expense post-convention tour for members of the American Association of Orthodontists and their families who care to visit Mexico City following the 1953 convention.

The tour will leave Dallas in special cars immediately after the convention, bound for Mexico City and a visit to interesting places in Mexico.

For further information please address: Mr. F. Alatorre, National Railways of Mexico, 2401 Transit Tower, San Antonio 5, Texas.

Entertainment Reservations for the Meeting

ALL SOCIAL AFFAIRS STRICTLY INFORMAL			NUMBER	COST
	Sunday, April 26			
6.30 P.M.	Cocktails and Buffet	$6.00		
	Monday			
12:30 P.M.	Golden Anniversary Luncheon	$4.00		
6:30 P.M.	Stag Dinner—Cocktails and Dinner	$7.50		
6:30 P.M.	Ladies' Cocktails and Dinner	$6.00		
	Tuesday			
12:30 P.M.	International Luncheon	$4.00		
12:30 P.M.	Ladies' Luncheon and Fashion Show	$4.00		
	Wednesday			
10:00 A.M.	Tour of Dallas	$2.00		
6:30 P.M.	President's Cocktail Party and Dinner Dance	$8.50		
	Enclose check for total cost			$

Only signed reservation sheets will be honored. Preference will be given according to *postmark* date.

Send check made payable to Dr. Frank Roark, 4150 Mockingbird Lane, Dallas 5, Texas.

Please print signature ----------

Address ----------

Member of A.A.O. Section ----------

Associate member ----------

Guest of A.A.O. Section ----------

Please fill in, tear out, and mail immediately.

Entertainment for the Ladies (A. B. Conly, chairman)

HOSTESSES

Mrs. Brooks Bell
Mrs. James W. Ford
Mrs. Clare K. Madden
Mrs. Franklin A. Squires
Mrs. Bibb Ballard
Mrs. A. B. Conly
Mrs. W. Harrell Delafield
Mrs. Joe Favors
Mrs. Robert E. Gaylord
Mrs. G. A. McJimsey
Mrs. Julius Tomlin
Mrs. Tom M. Williams
Mrs. Horace E. Wood

All social affairs strictly informal.

Sunday

6:30 to 8:00 — Cocktails and Buffet, Peacock Terrace of the Baker Hotel. (Informal.)
Tickets, $6.00 per person.

Monday

Adolphus Hotel

6:30 — Cocktails, Danish Room.
7:30 — Dinner, Roof Garden. (Informal.)
Tickets, $6.00 per person.

Tuesday

12:00 — Ladies' Luncheon, Mural Room, Baker Hotel.
Neiman Marcus Fashion Show.
Tickets, $4.00 per person.

Wednesday

10:00 to 12:00 — A Tour of Dallas.
Tickets must be obtained before 5:00 Tuesday at the registration desk on the mezzanine of the Baker Hotel.
Tickets, $2.00 per person.

6:30 — The President's Cocktail Party, Peacock Terrace of the Baker Hotel.
7:30 — The President's Dinner Dance, The Crystal Ball Room of the Baker Hotel. (Strictly informal.)
Tickets, $8.50 per person.

Entertainment for the Men (Robert E. Gaylord, chairman)

All social affairs strictly informal.

Sunday

6:30 to 8:00 — Cocktails and Buffet, Peacock Terrace of the Baker Hotel. (Informal.)
Tickets, $6.00 per person.

Monday

12:30 — The Golden Anniversary Luncheon.
The members of the American Association of Orthodontists, honoring our members who have been in the practice of dentistry fifty years or more.
Mural Room, Baker Hotel.
Tickets, $4.00 per person. (Guests invited.)

6:30 — Cocktails, Peacock Terrace of the Baker Hotel.
7:30 — Dinner, Peacock Terrace of the Baker Hotel.
Tickets, $7.50 per person.

Tuesday

12:30 — The International Luncheon, Peacock Terrace, Baker Hotel.
Tickets, $4.00 per person.

Wednesday

12:30 — The Past Presidents' Luncheon, English Room, Baker Hotel.

6:30 — The President's Cocktail Party, Peacock Terrace of the Baker Hotel.
8:30 — The President's Dinner Dance, Crystal Ball Room of the Baker Hotel. (Strictly informal.)
Tickets, $8.50 per person.

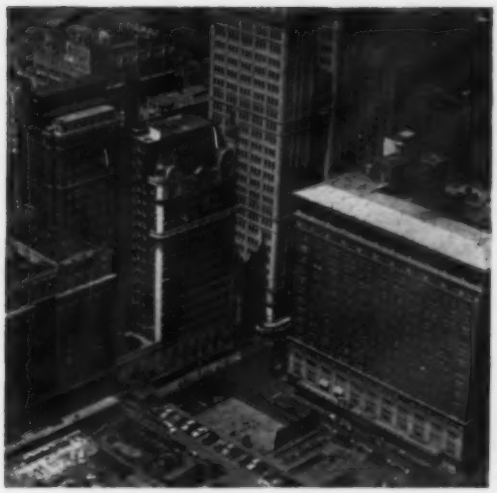

Fig. 1.—Convention hotels located in the heart of downtown Dallas include the Baker Hotel, large building at right, and the hotel Adolphus, ornately decorated building at left. The tall two-shaft building in the center is the Magnolia Petroleum Building.

Fig. 2.—Central expressway stretches through the heart of Dallas and will cost $21,000,000 for the eleven miles when completed. Running north to south, the expressway is located to the west of downtown Dallas. No traffic crosses the ten-lane superhighway.

Prize Essay Contest, American Association of Orthodontists

Eligibility.—Any member of the American Association of Orthodontists; any person affiliated with a recognized institution in the field of dentistry as a teacher, researcher, undergraduate or graduate student shall be eligible to enter the competition.

Character of Essay.—Each essay submitted must represent an original investigation and contain some new significant material of value to the art or science of orthodontics.

Prize.—A cash prize of $500 is offered for the essay judged to be the winner. The committee, however, reserves the right to omit the award if in its judgment none of the entries is considered to be worthy. Honorable mention will be awarded to those authors taking second and third places. The first three papers will become the property of the American Association of Orthodontists and will be published. All other essays will be returned.

Specifications.—All essays must be typewritten on 8½ by 11 inch white paper, double-spaced with 1 inch margins, and composed in good English. Three copies of each paper, complete with illustrations, bibliography, tables, and charts must be submitted. The name and address of the author must not appear in the essay. For purposes of identification, the author's name, together with a brief biographical sketch which sets forth his or her dental and/or orthodontic training, present activity and status (practitioner, teacher, student, research worker, etc.), should be typed on a separate sheet of paper and enclosed in a sealed envelope. The envelope should carry the title of the essay.

Presentation.—The author of the winning essay will be invited to present it at the meeting of the American Association of Orthodontists to be held at the Baker Hotel, Dallas, Texas, April 26 to 30, 1953.

Judges.—The entries will be judged by the Research Committee of the American Association of Orthodontists.

Final Submission Date.—No essay will be considered for this competition unless received in triplicate at the following address on or before March 1, 1953: Dr. J. A. Salzmann, 654 Madison Ave., New York 21, N. Y.

ROBERT E. MOYERS, Chairman, Research Committee,
American Association of Orthodontists,
230 College St.,
Toronto 2 B, Canada.

American Board of Orthodontics

The next meeting of the American Board of Orthodontics will be held at the Baker Hotel, Dallas, Texas, April 22 to April 26, 1953. Orthodontists who desire to be certified by the Board may obtain application blanks from the secretary, Dr. C. Edward Martinek, 661 Fisher Bldg., Detroit 2, Mich. To be considered at the Dallas meeting, all applications must be filed before March 1, 1953.

Great Lakes Society of Orthodontists

The newly elected officers of the Great Lakes Society of Orthodontists are as follows:

President, Scott T. Holmes - - - - - - - - - - 1205 Peck St., Muskegon, Mich.
Vice-President, Fred W. Black - - - - - - - - 835 Doctors Bldg., Cincinnati, Ohio
President-Elect, Louis Braun - - - - - - 1601 David Whitney Bldg., Detroit, Mich.
Secretary-Treasurer, Carl R. Anderson - - - 402 Loraine Bldg., Grand Rapids, Mich.

The Twenty-fourth Annual Meeting of the Society will be held at the Pantlind Hotel, Grand Rapids, Mich., Nov. 2, 3, and 4, 1953.

Middle Atlantic Society of Orthodontists

The program of the annual meeting of the Middle Atlantic Society of Orthodontists, held at the Traymore Hotel, Atlantic City, N. J., Oct. 19, 20, and 21, 1952, follows:

Sunday, October 19

President's reception.

Monday, October 20

Registration.

A Practical Approach to Orthodontic Problems. Dr. Charles M. Waldo, Boston, Mass.

Discussion.

A Composite Case Report of Class I Cases Having Insufficient Arch Length. Dr. Z. Bernard Lloyd, Washington, D. C.

Analysis and Discussion of Oral Changes as They Relate to Dental Occlusion. Dr. John H. Sillman, New York, N. Y.

Case Report. Dr. S. Lehman Nyce, Norristown, Pa.

Tuesday, October 21

The Crozat Method of Othodontic Therapy. Dr. Samuel L. Gore, New Orleans, La.

Personal Experiences With the Crozat Technique. Dr. Andrew F. Jackson, Philadelphia, Pa.

The Pacific Coast Society of Orthodontists

The Twenty-third General Meeting of the Pacific Coast Society of Orthodontists will be held at the Palace Hotel, San Francisco, on Monday, Tuesday, and Wednesday, Feb. 23, 24, and 25, 1953.

Northern Section meets Second Tuesday of March, June, September, and December.
Central Section meets Second Tuesday of March, June, September, and December.
Southern Section meets Second Friday of March, June, September, and December.

Officers and Committees

President	Reuben L. Blake, San Francisco, Calif.
President-Elect	Arnold E. Stoller, Seattle, Wash.
Vice-President	David L. England, Santa Barbara, Calif.
Secretary-Treasurer	Frederick T. West, San Francisco, Calif.

Northern Section

The regular meeting was held on Oct. 27, 1952, at the Vancouver Hotel, Vancouver, B. C., where our good Canadian friends always offer so much hospitality.

Chairman Dick Philbrick introduced our speaker of the day, Dr. Bob Ricketts, of Pacific Palisades, Calif., formerly of the University of Illinois. Bob really did a magnificent job of covering the temperomandibular joint in all of the aspects from growth to its actions and to its clinical significance. He worked harder and longer than we had any right to expect, and we are grateful to him for being so thorough.

At the business meeting a memorial was read for Sidney Hoskin and John Richmond. These were forwarded to Dr. Pollock, at Dr. Brooks Bell's request, for publication in the JOURNAL. Copies shall be forwarded to the Secretary of the Pacific Coast Society.

Central Section

True to the custom of the section, we again held our annual Christmas party on the evening of Thursday, Dec. 11, 1952. Everything was prepared for a really grand party at one of San Francisco's finest clubs, The Family, 545 Powell St. Cocktails and delicious hot hors d'oeuvres served in the library started off a wonderful evening. At 8:15 P.M. all gathered in the beautiful private dining room for a dinner prepared and served in a gracious style.

After dinner, Fred West advised the group that it had been the custom of the Central Section to provide some entertainment for the Pacific Coast Society meeting, and suggested

that a special assessment of $5.00 be made to be used for putting on a cocktail party for all attending the meeting. This motion was carried without objection.

As the hour had grown late, everything was cleared and the panel of George Hahn, Ernest Johnson, Fred West, and Wendell Wylie took over the head table; as moderator, Ray Curtner started presenting the first questions submitted in writing. The questions provided so much of interest that little time was left for questions from the floor. This proved to be so interesting that the moderator had to terminate the questions at 11:30 P.M. The meeting was adjourned by Chairman Brownell.

Southern Section

The Section met December 12 at 2:00 P.M. at the Nikabob, 875 S. Western Ave.

Chairman Merle Davis presented Howard Lang, Program Chairman, who in turn introduced Robert Ricketts who spoke on "The Role the Temporomandibular Joint Plays in Orthodontic Disgnosis and Treatment."

Following a social hour and dinner the program was continued by Eugene E. West, of San Francisco, who spoke on "The Importance of the Frankfort Incisor Angle in Diagnosis and Treatment." Meeting adjourned at 9:00 P.M.

The following members and guests were present: Merle B. Davis, Edward Corlett, Harry Faulkner, Chas. F. Mitchell, V. S. Nettleton, Fay C. Van, Gene Gould, J. Clifford Willcox, Theodore S. Martin, Clayton S. Kaps, Luther G. Moore, E. H. Farber, Mertan Hill, Cecil W. Neff, Forrest Moodie, Howard Lang, Dave England, John V. Avakian, Robert L. Whitney, Kenneth S. Raak, Wayne L. Zeiger, A. Everett, J. W. January, Berneice Leil Barkelew, Calvin Garverick, E. Donaldson, Philip L. Klein, J. Robert Smith, R. Keedy, James Johnson, Irwin Steuer, Richard S. Hambleton, Wm. M. Jow, Robt. Gawley, Dick N. Porter, H. L. Shannon, W. M. Adams, Paul Husted, S. L. Meek, H. E. Kratzer, S. S. MacArthur, E. G. Sagehorn, Bill Armstrong, A. F. Heimlich, C. E. Thompson, Harvey Cole, A. C. Heimlich, H. V. Muchnic, L. R. Sattler, Vern Fluhrer, Bernard W. Lueck, J. Redland Wittwin, W. C. Dorsett, Jr.

CALVIN GARVERICK, SECRETARY-TREASURER.

The Cincinnati Dental Society

The Cincinnati Dental Society takes pleasure in announcing that The Cincinnati Dental Society March Clinic Meeting and Children's Dental Health Day will be held at the Netherland Plaza Hotel on March 22, 23, and 24, 1953.

College of Dentistry, The Ohio State University

To meet the needs of dentists who wish advanced training in orthodontics, the College of Dentistry, Ohio State University, offers three orthodontic curricula: (1) full-time graduate study for two academic years, (2) full-time postgraduate work for eighteen months, and (3) part-time postgraduate work for twenty-four months.

Graduate work is available for those who wish to receive training in orthodontic specialization, teaching, or research, and may lead to a degree of Master of Dental Science. It is also possible to register for a postgraduate course in orthodontics and at the same time enroll as a candidate for the degree of Master of Science in one of the basic sciences such as anatomy or pathology.

The full-time postgraduate course is given for six consecutive quarters. The part-time postgraduate course is designed for dentists who have established their practices within reasonable distances of Columbus and prefer to continue those practices on a limited basis while studying for specialization. Classes are conducted the first three days of each week for eight consecutive quarters.

Certificates are granted by the College of Dentistry upon satisfactory completion of the postgraduate courses.

Admissions to all three curricula are for the Autumn Quarter of each year and classes start about the first of October.

All correspondence relating to advanced training in orthodontics should be addressed to the College of Dentistry, Ohio State University, Columbus 10, Ohio.

University of Maryland Alumni to Meet in March

The largest alumni meeting in the history of the Baltimore College of Dental Surgery, Dental School, University of Maryland, will be held in Baltimore on March 4, 5, and 6, 1953. The program will include scientific sessions, class reunions, inspection of the School's facilities, a variety of entertainment features, and a dinner in honor of Dr. J. Ben Robinson, Dean since 1924, who will retire in April.

University of Pennsylvania

The Thomas W. Evans Museum and Dental Institute of the School of Dentistry, University of Pennsylvania, Philadelphia, Pa., will give a postgraduate course on the philosophy and principles of the Universal appliance. The course will be conducted by Spencer R. Atkinson from April 13 to 18, 1953.

A course on the twin wire mechanism will be given by Joseph E. Johnson, April 6 to 10, 1953, at the University of Pennsylvania.

University of Washington, School of Dentistry, Department of Orthodontics

The University of Washington announces that it is receiving applications for its next graduate class in orthodontics, which will begin the latter part of September, 1953. This course leads to a Master of Science degree, or Certificate for qualified candidates. Additional information may be obtained by writing the Director of Graduate Dental Education, University of Washington, School of Dentistry, Seattle 5, Wash.

Northeastern Society of Orthodontists

The next meeting of the Northeastern Society of Orthodontists will be held at the Commodore Hotel, New York, N. Y., on Monday and Tuesday, March 9 and 10, 1953.

University of Pittsburgh, School of Dentistry

The Graduate School of the University of Pittsburgh announces that applications for the graduate course in orthodontics may be obtained by writing the Director of Graduate Study, School of Dentistry, University of Pittsburgh, Pittsburgh 13, Pa. Detailed information will be sent on request.

Johnson Alumni Club

The Johnson Alumni Club held its annual meeting Jan. 19, 20, and 21, 1953, at the Brown Hotel, Louisville, Ky.

Program

Several illustrated lectures by Dr. Johnson.

Case reports by:

William F. Ford	Chicago, Ill.
Joseph K. Gold	Holyoke, Mass.
K. E. Holland	Lincoln, Neb.
Anthony G. Miller, D.D.S.	Washington, D. C.
John Sage, D.M.D.	Flushing, N. Y.

Table Clinics:

1. Intraoral Photography; Uniform Results With Speed and Convenience. Stanley S. Goldberg, Chicago, Ill.

2. How I Try to Control Finger Nail Biting. David J. Thompson, Elmhurst, Ill.

3. Simple Method of Opening Space for Blocked-Out Biscuspids. Herbert G. Frankel, Cincinnati, Ohio.

4. Class III Elastics During the Transitional Period. Anthony G. Miller, Jr., Washington, D. C.

5. Auxiliary Pliers. Edward W. Peaslee, Augusta, Maine.

6. Twin Wire Technique Refinements. John E. Sage, Flushing, N. Y.

7. Some Auxiliaries Used With the Twin Wire Mechanism. John W. Richmond, Kansas City, Kan.

8. Correction of Anterior Maxillary Retractions (Under Bite) in a 37-year-old Orthodontist (yours truly). A. G. Greenhouse, Syracuse, N. Y.

9. Ten Years with the Headcap and Face Bow—What It Will and Won't Do. Its proper application When Its Use Is Indicated. Sidney Asher, Chicago, Ill.

10. Lingual Tipping of the Maxillary Incisors With the Twin Arch Appliance. Howard Yost, Grand Island, Neb.

11. Practical Cephalometry and Long Tube Radiography. Robert E. Ross, Detroit, Mich.

12. Group Clinic by the Graduate Students of the Orthodontic Department of Columbia University. Arthur C. Totten, Director, New York, N. Y.

13. Arch Expansion With Precious Metal Appliance. H. B. Singler, Springfield, Ill.

A banquet honoring Dr. and Mrs. Joseph E. Johnson was held Tuesday, Jan. 20, 1953, at 8:00 P.M.

There was a brief program, presentations, and entertainment.

Pennsylvania Orthodontist Joins Veterans Administration Council of Consultants

Herbert K. Cooper, of Lancaster, Pa., was recently appointed dental consultant on the Council of Chief Consultants of the Veterans Administration. Dr. Cooper, Director of the Lancaster Cleft Palate Clinic, is the first dentist to be named to the Veterans Administration council, it was announced by Vice Admiral J. T. Boone, Chief Medical Director.

Dr. Cooper, a faculty member of the dental schools at the University of Pennsylvania and Tufts College, is a past president of the Pennsylvania State Dental Society and a recipient of the Benjamin Rush Award of the State Medical Society in 1947.

Orthodontist Receives Callahan Memorial Award

B. Holly Broadbent, of Cleveland, has received the Callahan Memorial Award of the Ohio State Dental Association, in recognition of his achievement in the development of the Broadbent-Bolton cephalometer. The award was presented to Dr. Broadbent on November 10, during the annual session of the Ohio State Dental Association in Columbus.

Pioneer Orthodontist Honored

Dr. Frederick S. McKay, one of the pioneer orthodontists of America, was honored in Cleveland, Ohio on October 21 by the American Public Health Association for pioneer research toward reduction of dental caries through floridation of water supplies.

Dr. McKay and Dr. H. Trendley Dean, of Washington, D. C., received a joint Lasker award for medical research and public health achievement. The Lasker awards (Oscars of Medicine) were given to Drs. McKay and Dean and four other scientists for their work.

Dr. McKay was a student of Dr. Edward H. Angle, and practiced orthodontics in St. Louis, Mo., early in the century. He then moved to Colorado Springs, Colo., where he practiced for a number of years. Later he became interested in periodontology, practiced in New York City, then again moved to Colorado Springs, Colo.

The Second George W. Grieve Memorial Lecture

The Second George W. Grieve Memorial lecture was given in Convocation Hall, University of Toronto, on Monday, November 10. The speaker, Dr. Spencer R. Atkinson, of Pasadena, Calif., talked on "Teeth, Health, and Happiness." Dr. Roy Ellis, Dean of the Faculty of Dentistry, University of Toronto, was chairman of the meeting. He presented Dr. Braithwaite Dixon, Chairman of the Orthodontic Section of the Canadian Dental Association. Dr. Dixon explained the purpose of the Grieve Lecture and then introduced the speaker, Dr. Spencer R. Atkinson.

An appreciative audience listened to Dr. Atkinson describe simply and clearly some of the fundamentals of growth and development of the face and teeth. The talk was illustrated by many beautiful slides which enabled all to see the normal face contrasted to variations from the normal. Dr. Atkinson used his slides of skull sections to show how certain types of malocclusion originate and progress. The effects of abnormal pressures on the face of the growing child were emphasized. Dr. Atkinson advised parents to place their children at 2 years of age under regular dental supervision. It was pointed out that in this way variations from the normal occlusion could be recognized and diagnosed at an early age and measures instituted to prevent the occurrence of more serious types of malocclusion.

After the lecture Dr. Harry Thompson very capably expressed great appreciation to Dr. Atkinson for his most interesting and enlightening address.

Orthodontic Directory of the World

The sixteenth edition of the *Orthodontic Directory of the World* is again in the mail.

The *Orthodontic Directory of the World* has now grown from what was formerly a mere pamphlet to a book containing 226 pages.

All desiring copies of this directory, which contains the names of orthodontists throughout the world, can receive them by addressing the editors, Drs. Oren A. Oliver and William H. Oliver, 1915 Broadway, Nashville, Tenn.

Federal Security Agency, Children's Bureau

The year 1953 should be one in which the problems of three groups of children receive especial attention, Dr. Martha M. Eliot, Chief, Children's Bureau, Federal Security Agency, said today.

These three groups are children who are in trouble with the law, children who are born prematurely, and children in migrant families.

A drive to improve service for children who are in trouble with the law was launched by the Children's Bureau during 1952, Dr. Eliot reported. The Bureau now is working with more than 100 national organizations and scores of leaders in the juvenile delinquency field to enlist the support both of professional groups and citizens in this campaign.

Though the longtime goal of the Children's Bureau is to develop community services and facilities that will help to prevent juvenile delinquency, the current aims in helping children who are already classed as juvenile delinquents, Dr. Eliot said, are:

1. To get better handling of these youngsters by police.
2. To get children out of jail—an estimated 50,000 to 100,000 are kept in jails each year instead of in proper detention facilities.
3. To get more and better probation services available to juvenile courts.
4. To get better treatment of these youngsters in training schools.
5. To work out plans for more effective, better coordinated Statewide and local administration of services for delinquent children.

As an intensification of its campaign during 1953, the Bureau hopes to be able to develop standards for these services that will be of practical use to such groups as training school superintendents, juvenile courts, and police. In addition, the Bureau will continue and extend its efforts to enlist widespread support of good programs for both the prevention and treatment of juvenile delinquents.

A baby born prematurely runs nine times the risk of very early death that a fully developed infant runs, Dr. Eliot reported. She urged national support of every effort to get better prenatal care for women, so that they will have every possible chance to have full-term babies. She pointed out that during the past year, a number of State health agencies have developed facilities for care of premature infants through such means as premature centers, where from birth the babies received specialized medical and nursing care.

Too many children in migrant families are America's forgotten children. Moving with the harvests, they seldom see a teacher, a doctor, a nurse, or any of the other people to whom most children and their families turn for help. Their homes, too often, are shacks or tents. Often they live huddled together where there are only the crudest sanitary facilities. Be-

cause migrant families come and go, they have little chance to share in the health and welfare services available to residents.

Dr. Eliot pointed out that at the present time, although some communities in the country are making earnest efforts to help these migrant workers live healthy, happy lives, they receive little attention in many areas. "Federal, State and local authorities must be helped to end this sorry plight for hundreds of thousands of the nation's children," Dr. Eliot said.

Army Dental Student Program for 1952-1953 Reaches Halfway Mark

Thirty-six seniors from twenty-one dental schools throughout the United States have been selected by the Army for Dental Corps commissions under the Senior Dental Student Program, the Department of the Army announced today.

Under this program a student is commissioned as second lieutenant in the Medical Service Corps Reserve, with full pay and allowances. The student will be permitted to continue his studies in his school as an officer on active duty until he completes the requirements for a Doctor of Dental Surgery degree.

Upon graduation, each student will be appointed a first lieutenant in the Dental Corps reserve and may be offered an appointment in the same grade in the Regular Army Dental Corps. Following appointment in the Dental Corps Reserve, he will serve on active duty for at least two years.

Only thirty-nine vacancies exist in the current program. Major General Walter D. Love, DC, Chief of the Army Dental Corps, points out that applications for the unfilled vacancies will be considered until these openings have been filled. General Love has been gratified at the unusually high scholastic standing of the young men seeking commissions under this program which was temporarily discontinued in the spring of 1951 with the enactment of Public Law 779.

Dental seniors between the ages of 21 and 31 years, interested in joining the Army Dental Corps Student Program, may apply directly to the Surgeon General, Department of the Army, Washington 25, D. C. Selections are made by a board of officers selected by the Surgeon General of the Army.

Anniversary of First Landing by Helicopter on Hospital Ship Marked by USS Consolation

On Dec. 21, 1951, the first helicopter landed on a hospital ship—*USS Consolation* (AH 15).

Since that time 512 helicopter landings have been made on the flight deck of *Consolation*, bringing aboard 654 patients for medical treatment.

Consolation is now on her third tour of duty in the Far East. She carries a staff of 27 physicians, five Medical Service Corps officers, three dentists, 26 nurses, and 201 hospital corpsmen.

Helicopter landings, once extraordinary events, are now routine for *Consolation*. Approximately one-fourth of all patients come aboard by helicopter. A record 62 landings were made recently in one day. An average day in the operating zone sees about five 'copter landings.

"Egg beaters" have also transported hundreds of pints of vital blood to the ship. During one period the supply of whole blood reached a dangerous low. Helicopters were used to rush emergency replenishments.

Commanding *Consolation* is Capt. Otto J. Stein, USNR, of Santa Cruz, Calif. In command of *Consolation's* hospital is Capt. James R. Sayers, Medical Corps, USN, of Palatka, Fla.

Consolation, first hospital ship to appear in Korean waters after hostilities began, has handled more than 17,000 patients with another 21,250 treated as outpatients.

Wounded are usually kept aboard the ship a week or two, depending upon the seriousness of injuries, then transported by plane to hospitals in Japan or the United States.

A few months ago the difficult feat of landing three helicopters on its 60 by 60 foot flight deck was accomplished when a 'copter landed on the deck, already occupied by two

'copters, to speed a critically wounded casualty to surgery. In addition to 786 beds, the completely air-conditioned ship has three modern, well-equipped operating rooms. All types of surgery are performed.

The helicopter landing of last December was not the only first for *Consolation*. Among other notable firsts were: first hospital ship in the Korean action, first ship to have a woman medical officer on her staff, first vessel to return battle casualties to the United States from Korea, first to use an electroencephalograph (brain wave tracing) machine, first to install a flight deck, and first to maintain a blood bank.

Consolation has rendered hospital services to battle wounded during every major engagement in Korea, including the invasion of Inchon and the evacuation of Inchon and the evacuation of Hungnam. Eleven different nationalities among United Nations troops and many civilian casualties have received treatment from her physicians, dentists, nurses, and corpsmen.

Her Far Eastern duty has been interrupted only twice since August, 1950. After participation in the Inchon invasion of 1950, an experimental landing platform was installed at the United States Naval Shipyard in Long Beach, Calif. Upon completion of the work Aug. 16, 1951, she returned to the Korean Theater.

In December, 1951, anchored off Sokcho-ri, 15 miles above the thirty-eighth parallel, "Operation Helicopter" began within sight of Communist guns on the Korean coast. On Dec. 21, 1951, at 12:20 P.M. the first battle casualty ever flown from the field of battle to a hospital ship was landed by a Marine Corps helicopter. This was the beginning of a mission unprecedented in naval or medical history.

In late March, 1952, when battle action increased on the Korean western front, *Consolation* was ordered to Inchon Harbor to furnish medical support to the troops. Soon after her arrival patients began to arrive by boat and helicopter. Battle casualties received treatment within minutes after arrival.

After receiving 400 patients in ten weeks, *Consolation* was ordered home in June, 1952, for upkeep and replenishment. She returned to her old post in the Far East on Oct. 5, 1952, to continue her support of United Nations troops fighting in Korea.

Built and commissioned in May, 1945, *Consolation* saw little wartime service in World War II, but in the fall of 1945 she was actively engaged in Japanese waters evacuating and caring for ex-prisoners of war and allied nationals.

Despite the strain on her facilities, she gave necessary medical and surgical care to all and returned them to their homes in greatly improved condition. Later she took part in operation "Magic Carpet" which rushed thousands of men home from overseas at the close of the war.

One other hospital ship, Repose, has been equipped to land helicopters and another, Haven, is being similarly fitted.

Notes of Interest

Dr. Eugene L. Gottlieb announces the removal of his office to Medical Bldg., 165 North Village Ave., Rockville Centre, N. Y., practice limited to orthodontics.

Stephen G. Lee, Jr., D.D.S., announces the removal of his office from 144 Harrison St., East Orange, N. J., to 58 Chatham Road, Short Hills, N. J., practice limited to orthodontics.

Milton Neger, D.D.S., announces the removal of his office to the Medical Tower, 31 Lincoln Park, Newark, N. J., practice limited to orthodontics.

Dr. Ted Wachna announces the opening of his office at 1504 Ouellette Ave., Windsor, Ontario, Canada, practice limited to orthodontics.

Dr. Benjamin Weiss announces as his associate Dr. Martin L. Dean in the exclusive practice of orthodontics at the Medical Tower, Newark, N. J.

Dr. Henry F. Westhoff, D.D.S., announces the opening of a supplementary office in the Brown Bldg., 101 S. Meramec St., Clayton, Mo., practice limited to orthodontics.

Maurice R. Zingeser, D.D.S., M.S., wishes to announce the opening of his offices at 912 Selling Bldg., Portland, Ore., and 502 Pioneer Trust Bldg., Salem, Ore., for the practice of orthodontics.

OFFICERS OF ORTHODONTIC SOCIETIES

The AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS is composed of a representative of each one of the component societies of the American Association of Orthodontists.

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President, Scott T. Holmes - - - - - - - - - - - - 1205 Peck St., Muskegon, Mich.
Secretary-Treasurer, Carl R. Anderson - - - - - 402 Loraine Bldg., Grand Rapids, Mich.

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Secretary-Treasurer, Gerard A. Devlin - - - - - - - - - - 49 Bleeker St., Newark, N. J.

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President, George Callaway - - - - - - - - - - - 654 Madison Ave., New York, N. Y.
Secretary-Treasurer, Oscar Jacobson - - - - - - - 35 W. 81st St., New York, N. Y.

Pacific Coast Society of Orthodontists

President, Reuben L. Blake - - - - - - - - - 240 Stockton St., San Francisco, Calif.
Secretary-Treasurer, Frederick T. West - - - - - - 760 Market St., San Francisco, Calif.

Rocky Mountain Society of Orthodontists

President, Kenneth R. Johnson - - - - - - - - 303 N. Weber, Colorado Springs, Colo.
Vice-President, Don V. Benkendorf - - - - - - - 932 Metropolitan Bldg., Denver, Colo.
Secretary-Treasurer, Curtis L. Benight - - - - - - - 1001 Republic Bldg., Denver, Colo.

Southern Society of Orthodontists

President, Leland T. Daniel - - - - - - - - - - 407-8 American Bldg., Orlando, Fla.
Secretary-Treasurer, M. D. Edwards - - - - - - - 132 Adams Ave., Montgomery, Ala.

Southwestern Society of Orthodontists

President, Dan C. Peavy - - - - - - - - - - - - 745 Milam Bldg., San Antonio, Texas
Secretary-Treasurer, Fred A. Boyd - - - - - - - 1502 North Third St., Abilene, Texas

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